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THE AUTOMOBILE

Discussing 1911 Preparation

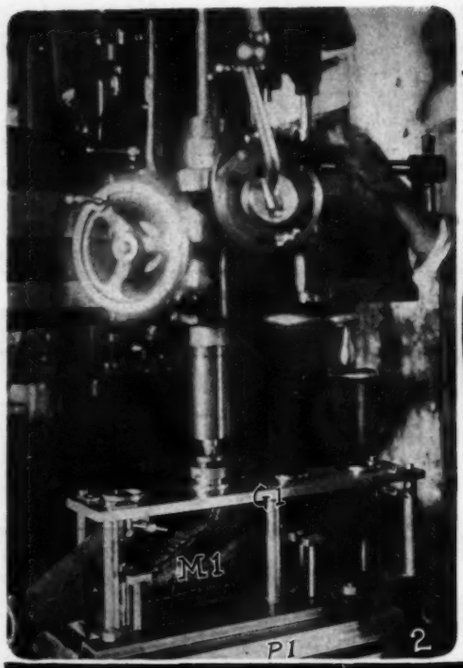
HOW THE FRANKLIN CYLINDERS ARE MANIPULATED IN THE FOUNDRY TO WELD THE VENTILATING STRIPS TO THE CASTINGS—INTERIOR VIEW OF THE THOMAS-FLYER TOWNCAR BROUGHAM

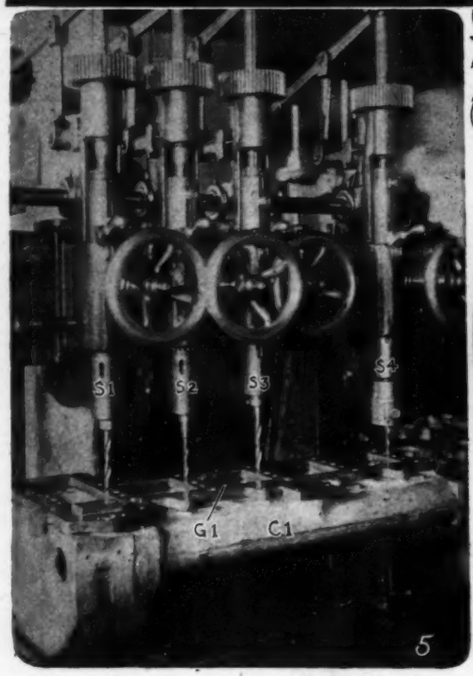
CONTINUING the plan which has for its motive the idea of imparting to automobilists and those who may take a 1911 interest in the art, it will be the purpose here to present with brevity for the sake of clearness, the second series of the automobiles that will be placed on exhibition during the automobile show season. In order, however, to impart the information along broader lines, the occasion is taken to portray the methods in vogue in a couple of the plants devoted to the manufacture of automobiles, in order that the interested reader will have before him something of the preparation which has to be made before it can be said that automobiles will be on an interchangeable basis, which detail, however important it may be, is not to be appreciated when the user's effort is confined to a mere inspection of the finished product.

It is of course impossible to show in any one issue how all the automobiles are manufactured, nor is it the purpose to infer that

the manufacturing is conducted in the several plants on a common basis. It would not be too much to state that there are distinct differences and that several schools of design are responsible for the various automobiles that are now being built for 1911 use. But this is not to say that the quality of the product will be better or worse, depending upon the school of design that is responsible for it; the point will be adequately illustrated by calling attention to the number of universities that are responsible for the education of the men who make their mark in the world. They seem to be endowed with reasoning power, skill, and scope, on a competitive basis as they are whittled out at the respective universities, and so it may be said of the automobiles; they serve their respective ends with a fidelity that is commendable, and the only chance the purchasers will take lies in the wisdom or lack of it that accompanies the selection.

The great question, then, will be to go to the shows dressed in a discriminating state of mind, nor will it be a question involving discrimination as between good and bad automobiles so much as it will be a question which will have for its foundation the putting of the cars into good or bad service. To be able to select the particular kind of car that will best perform in a given service requires that the individual making the selection shall first have a definite and clear idea of the service to be rendered, and then, by virtue of knowledge obtained beforehand, find the very automobile that will be conspicuously capable in that service. Indications point to the coming shows as being of unusual interest, and it is predicted that the display of cars will be wide and varied.





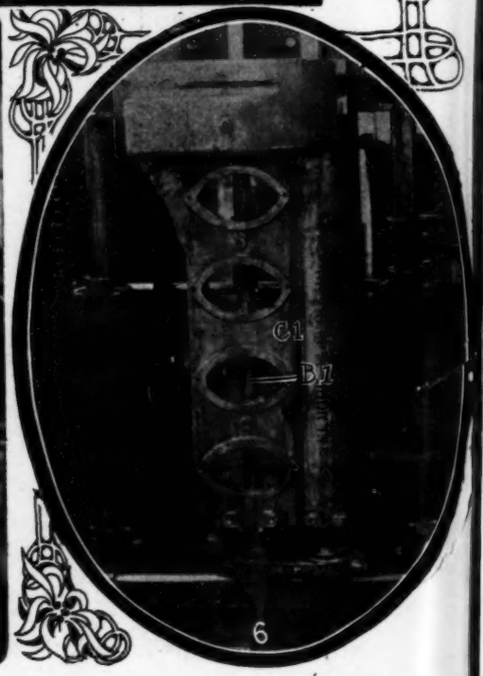


Fig. 2—In the Elmore Plant with a jigging fixture G1 holding the manifold M1 on the platen P1 of a special drill so arranged as to accurately finish the four faces of the manifold M1 at one time.

Fig. 3—In the Elmore Plant, showing a No. 4 Cincinnati Vertical Milling Machine M1 with a multiple cutter cat-head C1 facing off a crankcase C2, the latter being held in a fixture F1 with means for centering, adjusting, and holding the work.

Fig. 4—In the Franklin Plant, showing the air-cooled cylinder C1 bolted to an angle plate P1 being finished by grinding G1, using a Heald type of grinder.

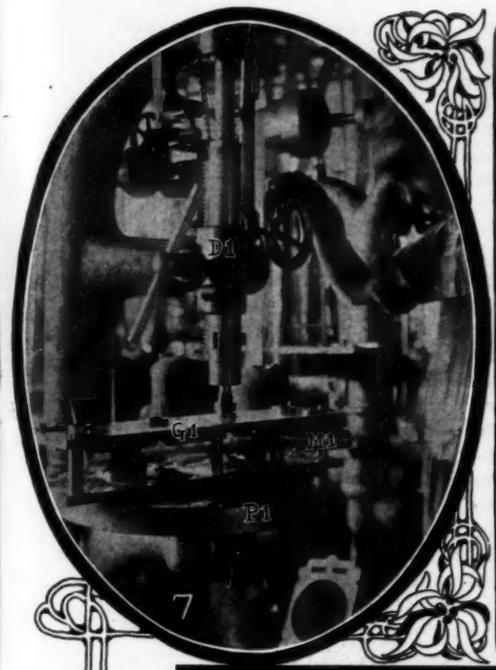
Fig. 5—In the Elmore Plant, showing a jig G1 on the crankcase C1, with spindles S1, S2, S3 and S4, of a multiple spindle drill so contrived as to reach all the holes as indicated in the platen.

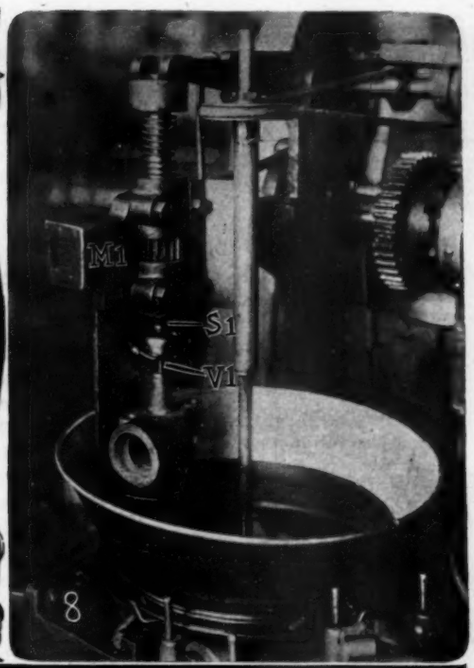
Fig. 6—In the Franklin Plant, showing a Gleason Planer G1 with its progressive cutter C1 planing the teeth on the gear G2. This is one of a complete battery of modern gear fashioning equipment used in this plant for producing noiseless performing gears from special types of gear steel.

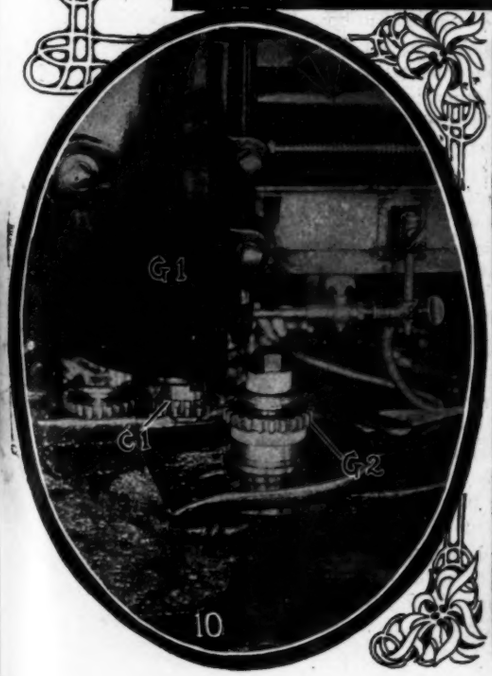
Fig. 7—In the Elmore Plant, presenting a drill press D1 using a fixture with a jig plate G1 on the platen P1 finishing a manifold M1 which under ordinary circumstances would be an extremely difficult piece to handle, but

Thomas

Referring to Fig. 12 of the Model M 6-cylinder, water-cooled Thomas motor, the details of which are given in the accom-







panying tabulation, the carbureter C1 is supported by a separable neck N1 attached to the intake manifold M1, the latter having branches B1 and B2 in combination with the common feeder F1 resulting in the equal delivery of a fixed volume of well-proportioned mixture to the respective cylinders, this being one of the most important details in connection with six-cylinder work, and it has been found that this plan works out to the maximum of efficiency under practical conditions of service. The magneto M2 is located on a ledge L1 at the front end of the motor and is driven from a gear in the halftime housing H1 with a universal joint U1 intervening, so that the magneto, in addition to being flexibly mounted, may be removed at a moment's notice by undoing the wing nut N2, and in replacing the magneto there is no danger of throwing the same out of line or making a mistake. The general design of the motor is on a uniform basis with an eye to refinements of detail

in this way the work is quickly and accurately done.

Fig. 8—In the Franklin Plant, showing one member of a special machine M1 fitted with a series of spindles S1 arranged for grinding in the valves V1 imparting precisely the same motion in the same way as when the valves are ground by an experienced man as a "bench" undertaking.

Fig. 9—In the Franklin Plant, showing shields S1, S2, S3, etc., fitted around all of the machine tools thus preventing oil and chips from strewing about the floor, and it is one of the features of this plant that the hardwood floor is scrubbed every night and is kept scrupulously clean, thus reducing the fire hazard enormously and adding to the efficiency of the workmen.

Fig. 10—In the Elmore Plant, showing a special vertical boring bar B1 in the crankcase C1, with an automatic feed boring all the main journal holes simultaneously.

Fig. 11—In the Franklin Plant, showing an overhead turntable T1 on a circular track T2, using a block and using a tackle T3 lifting the receptacle R1 which is full of oil-soaked chips in order to place it in the housing H1 of the centrifugal oil separator, showing how one laborer is enabled to separate the oil from all of the chips of the plant in a clean and efficacious way, thus indicating something of the plan for economy which has been worked out.

throughout, and in the installation in the chassis the same care is taken, including a well-contrived distributing box D1 for the high tension wires.

Referring to Fig. 23 of the universal joint used in the driving of the Thomas magneto, attention is called to the hardened and ground shaft S1 with the integral flange F1 and the mating flange M1 which, together with the accommodation piece P1, comprise the set. This arrangement affords an adequate degree of flexibility, renders the drive positive and secure, eliminating the ills that ordinarily come through the absence of flanging and the difficulty of keying in conjunction with relatively small shafts such as are in common use in magneto work.

Marathon

Referring to Fig. 13 of the Marathon motor, details of which are given in the accompanying tabulation, attention is called

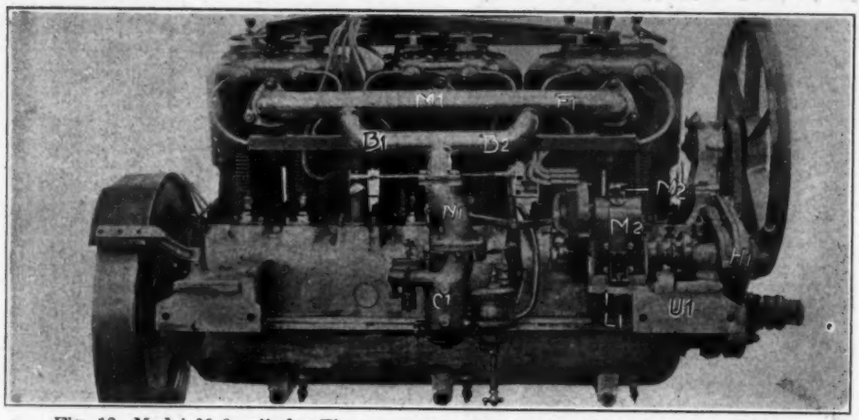


Fig. 12—Model M 6-cylinder Thomas motor showing the location of the magneto.

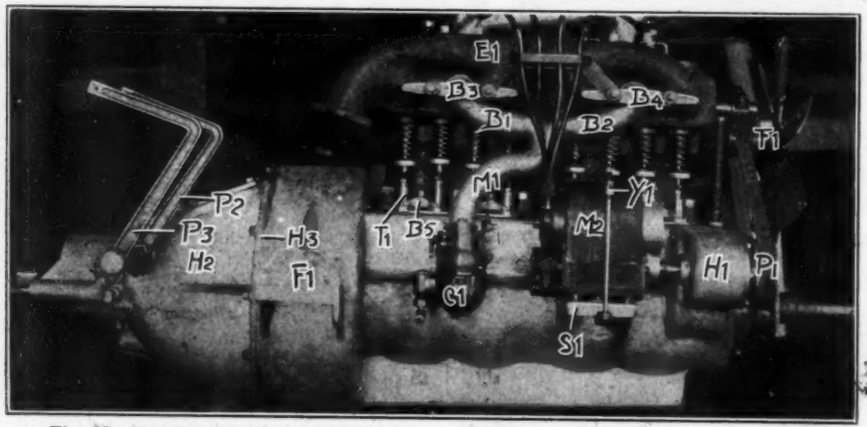


Fig. 13—Marathon motor showing a self-contained motor, magneto and carbureter

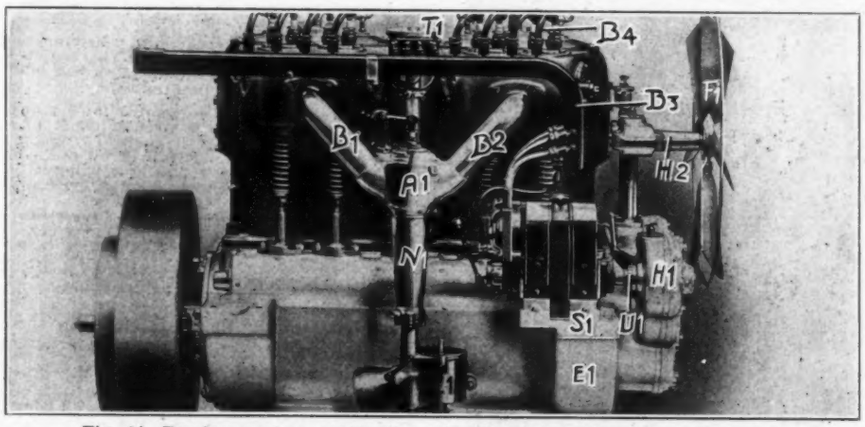


Fig. 14—Peerless motor construction, showing the location of the magneto

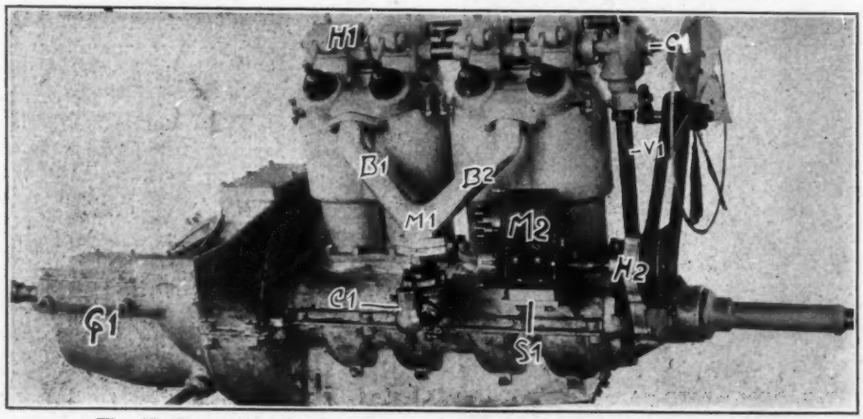


Fig. 15—Presenting the Jackson motor with overhead valve construction

to the carbureter C1 supported by an offset manifold M1 with branches B1 and B2, leading to the two pairs of cylinders and the exhaust manifold E1 which, in common with the intake manifold, are held in place by bridge pieces B3 and B4. The magneto M2 rests upon a shelf S1 and is held down by a yoke Y1, putting tension on a pair of bolts. The magneto is driven by a gear in the housing H1, and the same shaft extends through to the pulley belt P1, by means of which a fan F1 is driven. The motor is supported in front at a single point and is given rear support by the arm with its face F1 bolting to the chassis frame on each side.

The transmission gear is in the extension housing H2, the latter being flanged to the flywheel housing H3. The clutch is actuated by the pedal P2, and the service brake is actuated by the pedal P3. The cylinders of the T-type working 4-cycle water-cooled are substantially flanged to the crankcase, and the valve tappets T1 are held down by bridges B5.

Peerless

Referring to Fig. 14 of the Peerless 4-cylinder water-cooled motor, the details of which are given in the accompanying tabulation, the carbureter C1 of the Peerless make has a long neck N1 and a supplementary air valve A1, with branches B1 and B2 leading to the respective pairs of cylinders. The magneto M1 rests upon a shelf S1 and is driven by a shaft through a universal joint U1, taking power from a gear in the halftime housing H1. It is noteworthy that the magneto shaft is short and a quick detachable means of fastening is afforded. The timer T1 passes upon the left side of the motor to a point above the cylinders, so that it is in a get-at-able position, and the high tension leads from the magneto to the spark plug are distrib uted through a box B3; from this box branches B4 on the jackstrap plan make connection with the spark plugs. Among the other noteworthy features is the method of driving the fan F1 by a shaft in a housing H2, taking power by a system of gears, all of which are enclosed and dustproof. The oil pump is on the under side below the enlargement E1 in a position which is accessible for inspection or a more complete examination.

Jackson

Referring to Fig. 15 of the water-cooled Jackson motor, the details of which are more completely given in the accompanying tabulation, it will be observed that the carbureter C1 is supported by a manifold M1 with branches B1 and B2 connecting with the two pairs of cylinders, and attention is called to the fact that these branches extend almost down to the carbureter. Overhead valves are used in this motor with a camshaft C driven by a vertical shaft V1 and rockers in housings H1, of which there are four so arranged as to place the valves

in an angular position with respect to the vertical, thus making the flow of gas into the combustion chamber as nearly direct as possible, and they are made of relatively large diameter, so that the depression losses are minimized. The magneto M2 is located on a shelf S1 and is driven by a shaft from a gear in the halftime housing H2, which shaft extends out to accommodate a shrouded pulley which serves as the driving member to actuate the flat-belted fan. The power plant is of the self-contained type, with a transmission gearcase G1 in integral relation with the housing for the flywheel.

Referring to Fig. 22 of the Jackson overhead camshaft construction, attention is called to the oil-tight housings H1 for the cam shaft C1, by means of which the overhead construction is rendered noiseless and satisfactory. The housing is split on the center line as shown at H2, and the various bearings are maintained in a state of profuse lubrication by a system of ducts and the methods contrived.

Moline

Referring to Fig. 16 of the Moline 4-cylinder water-cooled motor shown as it rests in the chassis, the carbureter is held in place by the manifold M1 with branches B1 and B2 passing up under the exhaust manifold E1, and the two manifolds are supported in place by bridge pieces B3 and B4. The magneto M1 is on the left side of the motor to the front and is driven by a shaft from a gear meshing with the halftime train in the oil-tight housing. The high tension timer T1 is on the left side front of the motor and the high tension wires are distributed to the respective spark plugs through a tube T2.

Haynes

Referring to Fig. 17 of the Haynes 4-cylinder water-cooled motor, the magneto M1 and the water-pump W1 are driven by a common shaft from a gear in the housing H1. The same shaft extends through to accommodate a shrouded pulley for the fan belt. The transmission on gearcase G1 is held in place by arms A1 on each side of the flywheel F1 integral with the crankcase C1.

Warren-Detroit

Referring to Fig. 18 of the Warren-Detroit 4-cylinder water-cooled motor of the block type, more complete details of which are given in the accompanying tabulation, it will be observed that the magneto M1 rests upon a finished face F1 of the rear motor support S1 and is driven by a shaft S2 in common with a water pump W1 through a universal joint U1 taking power through a gear in the oil-tight housing H1 of the halftime gears. The carbureter is located on the opposite side, and in this view the simplicity of the blocked casting is brought into prominence. The crankcase is split on the center line C1 and the

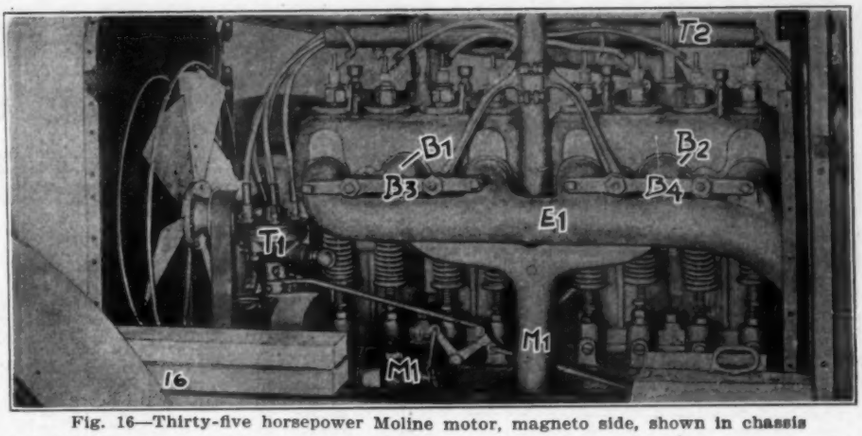


Fig. 16—Thirty-five horsepower Moline motor, magneto side, shown in chassis

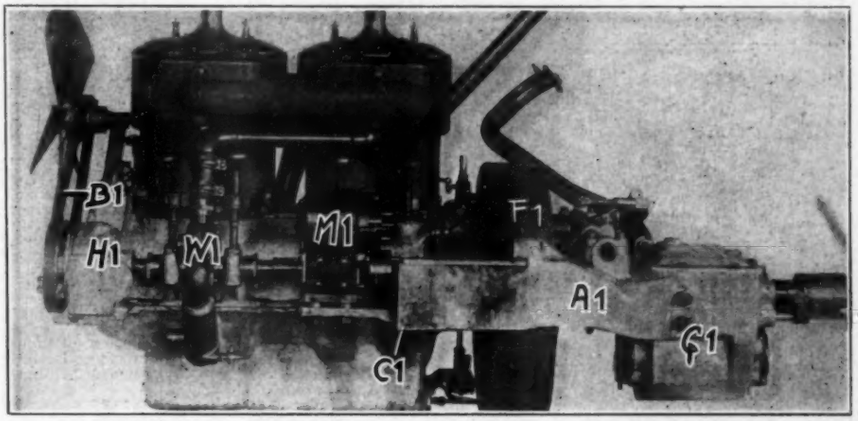


Fig. 17—Example of Haynes motor work along self-contained lines

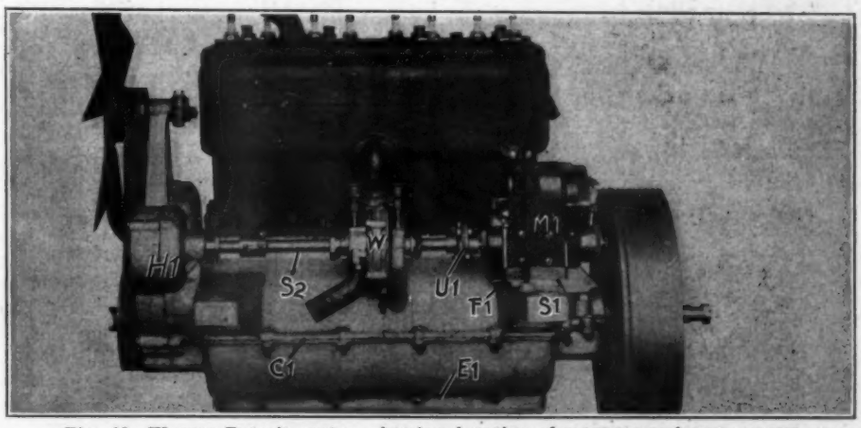


Fig. 18—Warren-Detroit motor, showing location of magneto and water pump

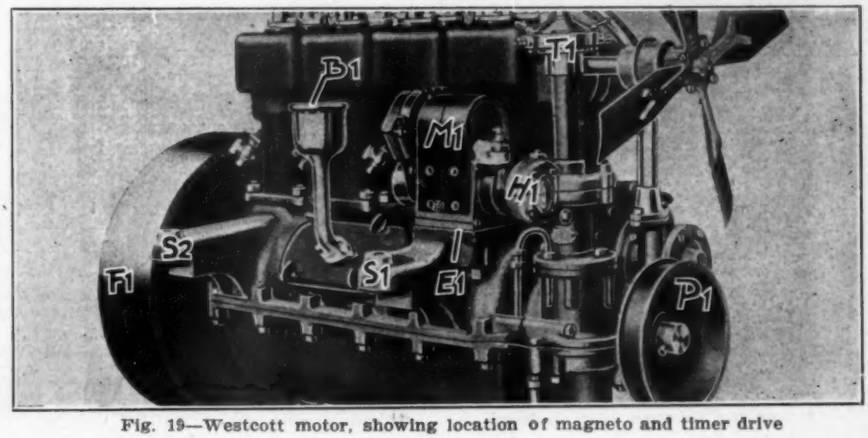
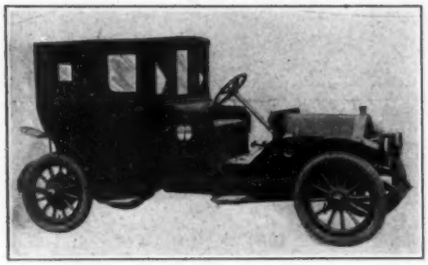
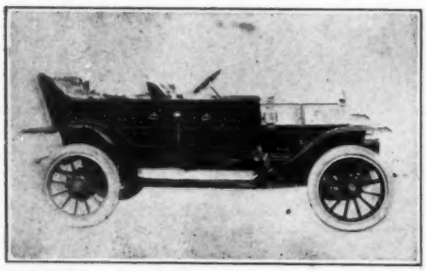


Fig. 19—Westcott motor, showing location of magneto and timer drive

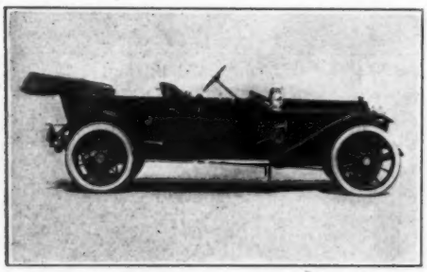
Specifications of the Princi



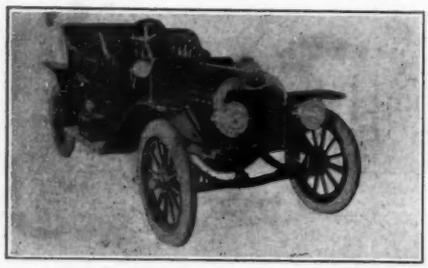
Thomas "Flyer," 4-28 town car brougham



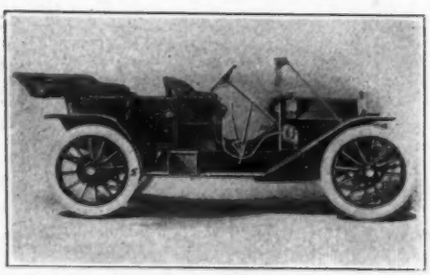
Jackson Model 41, fore-door touring car



Peerless torpedo type of touring car



Marathon Fire Chief type of touring car



Moline toy tonneau fully equipped

MAKE AND MODEL	Price	H.P.A.L.A.M.	BODY		MOTOR				COOLING		IGNITION		Lubrication
			Type	Seats	Cyl.	Bore Inches	Stroke Inches	Cyl. Cast	Radiator	Pump	Magneto	Battery	
Marathon M	$1500	28.9	Tour'g..	5	4	4½	4½	Pairs..	H'comb..	Syph'n	H. T...	Dry....	Splash..
Marathon N	1500	28.9	R'ster..	4	4	4½	4½	Pairs..	H'comb..	Syph'n	H. T...	Dry....	Splash..
Jackson "51"	2200	36.1	Tour'g..	5	4	4⅝	4⅝	Single.	Cellular..	Syph'n	H. T...	Dry....	Pump..
Jackson "51"	2200	36.1	Tour'bt	4	4	4⅝	4⅝	Single.	Cellular..	Syph'n	H. T...	Dry....	Pump..
Jackson "41"	1700	32.4	Tour'g..	5	4	4½	4½	Pairs..	H'comb..	Syph'n	H. T...	Dry....	Pump..
Jackson "41"	1700	32.4	Tour'bt	4	4	4½	4½	Pairs..	H'comb..	Syph'n	H. T...	Dry....	Pump..
Jackson "38"	1650	30.6	Torp'o..	4	4	4⅜	4½	Pairs..	H'comb..	Syph'n	H. T...	Dry....	Pump..
Jackson "30"	1250	25.6	Tour'g..	5	4	4	4	Pairs..	H'comb..	Syph'n	H. T...	Dry....	Pump..
Jackson "25"	1100	22.5	R'ster..	2	4	3½	4½	Block.	H'comb..	Syph'n	H. T...	Dry....	Pump..
Peerless "29"	4200	25.6	Limous.	6	4	4	4⅛	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "29"	4300	25.6	Land't..	6	4	4	4⅛	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4300	40.0	Tour'g..	7	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4300	40.0	C.coupl.	5	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4300	40.0	R'ster..	5	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4300	40.0	Phaet..	2	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4300	40.0	T. ton..	4	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4300	40.0	Torp'o..	4	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	5400	40.0	Limous.	7	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	5500	40.0	Land't..	7	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "31"	4800	40.0	D.lim...	7	4	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6000	60.0	Tour'g..	7	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6000	60.0	C.coupl.	5	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6000	60.0	R'ster..	5	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6000	60.0	Phaet..	2	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6000	60.0	P. ton..	4	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6000	60.0	Torp'o..	4	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	7000	60.0	Limous.	7	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	7100	60.0	Land't..	7	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Peerless "32"	6500	60.0	D. lim..	7	6	5	5½	Pairs..	Tubular.	Gear..	H. T...	Storage	Pump..
Moline M-35	1650	25.6	Tour'g..	5	4	4	6	Pairs..	Tubular.	None..	H. T...	Storage	Pump..
Moline M-35	1600	25.6	T. ton..	4	4	4	6	Pairs..	Tubular.	None..	H. T...	Storage	Pump..
Haynes 20	2000	28.9	Tour'g..	5	4	4½	5	Pairs..	Cellular..	Gear..	H. T...	Dry....	Splash..
Haynes 20	2000	28.9	T. ton..	4	4	4½	5	Pairs..	Cellular..	Gear..	H. T...	Dry....	Splash..
Haynes 20	2000	28.9	R'bout.	2	4	4½	5	Pairs..	Cellular..	Gear..	H. T...	Dry....	Splash..
Haynes Y	3000	40.0	Tour'g..	7	4	5	5½	Pairs..	Cellular..	Gear..	H. T...	Storage	Pump..
Warren-Detroit "30"..													
11-A	1200	25.6	R'ster..	3	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Dry....	Splash..
11-B	1300	25.6	D. ton..	4	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Dry....	Splash..
11-C	1325	25.6	Tour'g..	5	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Dry....	Splash..
11-D	1200	25.6	R'ster..	2	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Dry....	Splash..
11-E	1750	25.6	Coupe..	2	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Storage	Splash..
11-F	1500	25.6	Torp'o..	4	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Storage	Splash..
11-G	1500	25.6	F.d.Tg..	5	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Storage	Splash..
11-H	1300	25.6	Delv'ry	2	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Dry....	Splash..
11-I	1300	25.6	Delv'ry	2	4	4	4½	Block.	Tubular.	Cent'fl	H. T...	Dry....	Splash..
E-M-F- "30"	1250	25.6	Tour'g..	5	4	4	4½	Pairs..	Tubular.	Cent'fl	H. T...	Dry....	Gravity
Thomas K	6000	72.6	Tour'g..	7	6	5½	5½	Single.	H'comb..	Gear..	H. T...	Dry....	Mech..
Thomas K	6000	72.6	Fly'b't.	4	6	5½	5½	Single.	H'comb..	Gear..	H. T...	Dry....	Mech..
Thomas K	6000	72.6	T'bout..	[3]	6	5½	5½	Single.	H'comb..	Gear..	H. T...	Dry....	Mech..
Thomas K	3500	72.6	Limous.	7	6	5½	5½	Single.	H'comb..	Gear..	H. T...	Dry....	Mech..
Thomas K	7600	72.6	Land't..	7	6	5½	5½	Single.	H'comb..	Gear..	H. T...	Dry....	Mech..
Thomas M	3750	43.8	Tour'g..	5	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	3900	43.8	F.d.Tg.	5	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	3850	43.8	Tour'g..	7	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	4000	43.8	F.d.Tg..	7	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	3750	43.8	F'bout..	4	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	3900	43.8	F'd'F't.	4	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	3750	43.8	Tour'g..	4	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	5000	43.8	Limous.	7	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas M	5100	43.8	Land't..	7	6	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas R	4000	28.0	Brougm	6	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas R	4100	28.0	Limous.	6	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Thomas R	4250	28.0	Land't..	6	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Mech..
Velie 40-G	1800	32.4	Tour'g..	5	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Pump..
Velie 40-G1	2000	32.4	F.d.Tg..	5	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Pump..
Velie 40 H1	2000	32.4	R'ster..	2	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Pump..
Velie 40 I	1800	32.4	T. ton..	4	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Pump..
Velie 40 GLL	3000	32.4	Limous.	7	4	4½	5½	Pairs..	H'comb..	Cent'fl	H. T...	Dry....	Pump..
Westcott G	2000	....	R'ster..	7	4	4⅜	5	Single.	H'comb..	Cent'fl	H. T...	Dry....	Splash..
Westcott F	2000	....	F.d.Tg..	5	4	4⅜	5	Single.	H'comb..	Cent'fl	H. T...	Dry....	Splash..
Westcott H	2250	....	F.d.Tg..	7	4	4⅜	5	Single.	H'comb..	Cent'fl	H. T...	Dry....	Splash..
Westcott J	2000	....	R'ster..	4	4	4⅜	5	Single.	H'comb..	Cent'fl	H. T...	Dry....	Splash..
Westcott	1900	....	R'ster..	4	4	4⅜	5	Single.	H'comb..	Cent'fl	H. T...	Dry....	Splash..

[1] Or 60 inches. [3] And storage battery.

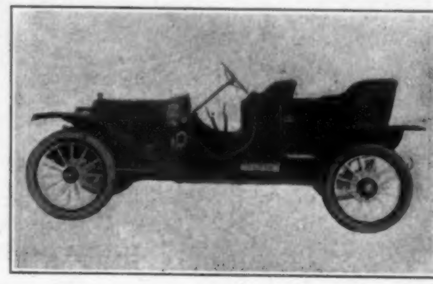
MARATHON—Southern Motor Works, Nashville, Tenn.
JACKSON—Jackson Automobile Company, Jackson, Mich.
PEERLESS—Peerless Motor Car Company, Cleveland, Ohio.
MOLINE—Moline Automobile Company, East Moline, Ill.
HAYNES—Haynes Automobile Company, Kokomo, Ind.

pal Mechanical Dimensions

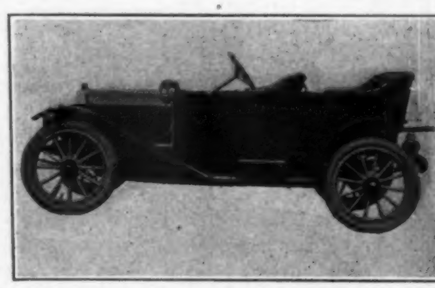
Clutch	TRANSMISSION Type	Speeds	Location	Drive	Wheelbase	Tread	Frame	BEARINGS Crankshaft	Trans-mis'n	Axle	Weight	TIRES Front	Rear
M. Disc...	Sel....	3	Motor...	Shaft....	116	56	P. Steel..	3 Plain.	Ball...	B. & R.	2250	34x3½	34x3½
M. Disc...	Sel....	3	Motor...	Shaft....	116	56	P. Steel..	3 Plain.	Ball...	B. & R.	2250	34x3½	34x3½
M. Disc...	Sel....	3	Motor...	Shaft....	120	[1]56	P. Steel..	5 Plain.	Ball...	R. & B.	2800	36x4	36x4
M. Disc...	Sel....	3	Motor...	Shaft....	120	[1]56	P. Steel..	5 Plain.	Ball...	R. & B.	2800	36x4	36x4
M. Disc...	Sel....	3	Motor...	Shaft....	110	[1]56	P. Steel..	3 Plain.	Ball...	R. & B.	2400	34x4	34x4
M. Disc...	Sel....	3	Motor...	Shaft....	110	[1]56	P. Steel..	3 Plain.	Ball...	R. & B.	2400	34x4	34x4
M. Disc...	Sel....	3	Motor...	Shaft....	115	[1]56	P. Steel..	3 Plain.	Ball...	R. & B.	2450	34x4	34x4
M. Disc...	Sel....	3	Motor...	Shaft....	105	[1]56	P. Steel..	3 Plain.	Ball...	R. & B.	2000	32x3½	32x3½
M. Disc...	Sel....	3	Unit....	Shaft....	105	[1]56	P. Steel..	2 B.&pl	Ball...	R. & B.	1850	32x3½	32x3½
Exp. b'd..	Sel....	4	Motor...	Shaft....	113	56-	P. Steel..	Plain...	Ball...	Ball....	.....	34x4½	34x4
Exp. b'd..	Sel....	4	Motor...	Shaft....	113	56	P. Steel..	Plain...	Ball...	Ball....	.....	34x4½	34x4½
Exp. b'd..	Sel....	4	Motor...	Shaft....	123	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	123	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	119½	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	119½	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	119½	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	123	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	123	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	123	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	123	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4	36x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	136	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	136	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	132½	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	132½	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	132½	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	136	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	136	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	136	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Exp. b'd..	Sel....	4	Motor...	Shaft....	136	56	P. Steel..	Plain...	Ball...	Ball....	.....	36x4½	37x5
Cone.....	Sel....	3	Motor...	Shaft....	112	56	Dr. St...	Plain...	Roller.	R. & B.	2400	36x3½	36x3½
Cone.....	Sel....	3	Motor...	Shaft....	112	56	Dr. St...	Plain...	Roller.	R. & B.	2400	36x3½	36x3½
Con.b'd...	Sel....	3	Motor...	Shaft....	114	56	P. Steel..	Plain...	Roller.	Roller,,,	2400	34x4	34x4
Con.b'd...	Sel....	3	Motor...	Shaft....	114	56	P. Steel..	Plain...	Roller.	Roller...	2400	34x4	34x4
Con.b'd...	Sel....	3	Motor...	Shaft....	114	56	P. Steel..	Plain...	Roller.	Roller...	2400	34x4	34x4
Con.b'd...	Sel....	3	Motor...	Shaft....	125	56	P. Steel..	Plain...	Roller.	Roller...	3400	36x4½	36x4½
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2150	34x3½	34x3½
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2200	34x3½	34x3½
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2200	34x3½	34x3½
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2150	34x3½	34x3½
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2350	35x4	35x4
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2200	35x4	35x4
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2250	35x4	35x4
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2250	33x4	33x4
Cone.....	Sel....	3	Unit....	Shaft....	110	56	P. Steel..	Plain...	Plain..	Ball....	2300	33x4	33x4
Cone.....	Sel....	3	Axle....	Shaft....	106	[1]56	P. Steel..	Plain...	Plain..	Roller..	2150	32x3½	32x3½
3 Disc....	Sel....	4	Unit....	Chain...	140	56	P. Steel..	Plain...	B.&R.	Ball....	4500	38x4½	38x5½
3 Disc....	Sel....	4	Unit....	Chain...	140	56	P. Steel..	Plain...	B.&R.	Ball....	4340	38x4½	38x4½
3 Disc....	Sel....	4	Unit....	Chain...	140	56	P. Steel..	Plain...	B.&R.	Ball....	4250	38x4½	38x4½
3 Disc....	Sel....	4	Unit....	Chain...	140	56	P. Steel..	Plain...	B.&R.	Ball.....	4800	38x4½	38x5½
3 Disc....	Sel....	4	Unit....	Chain...	140	56	P. Steel..	Plain...	B.&R.	Ball....	4800	38x4½	38x5½
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3775	36x4½	36x4½
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3800	36x4½	36x4½
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3800	36x4½	37x5
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3800	36x4½	37x5
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3660	36x4½	36x4½
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3685	36x4½	36x4½
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	3650	36x4½	36x4½
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	4150	36x4½	37x5
3 Disc....	Sel....	3	Unit....	Shaft....	125	56	P. Steel..	Plain...	Ball...	Roller...	4175	36x4½	37x5
3 Disc....	Sel....	3	Unit....	Shaft....	123	56	P. Steel..	Plain...	Ball...	Roller...	3650	34x4½	34x4½
3 Disc....	Sel....	3	Unit....	Shaft....	123	56	P. Steel..	Plain...	Ball...	Roller...	3620	34x4½	34x4½
3 Disc....	Sel....	3	Unit....	Shaft....	123	56	P. Steel..	Plain...	Ball...	Roller...	3680	34x4½	34x4½
Disc......	Sel....	3	Unit....	Shaft....	115	56	P. Steel..	Plain...	Roller.	Roller...	2800	34x4	34x4
Disc......	Sel....	3	Unit....	Shaft....	115	56	P. Steel..	Plain...	Roller.	Roller...	2850	34x4	34x4
Disc......	Sel....	3	Unit....	Shaft....	115	56	P. Steel..	Plain...	Roller.	Roller...	2500	34x4	34x4
Disc......	Sel....	3	Unit....	Shaft....	115	56	P. Steel..	Plain...	Roller.	.Roller..	2600	34x4	34x4
Disc......	Sel....	3	Unit....	Shaft....	115	56	P. Steel..	Plain...	Roller.	.Roller..	3400	35x4½	35x4½
Cone.....	Sel....	3	S. Frame	Shaft....	120	56	P. Steel..	Plain...	Ball...	Roller...	3000	36x4	36x4
Cone.....	Sel....	3	S. Frame	Shaft....	120	56	P. Steel..	Plain...	Ball...	Roller...	3000	36x4	36x4
Cone.....	Sel....	3	S. Frame	Shaft....	120	56	P. Steel..	Plain...	Ball...	Roller..	3000	36x4	36x4
Cone.....	Sel....	3	S. Frame	Shaft....	112	56	P. Steel..	Plain...	Ball...	Roller...	2700	34x4	34x4
Cone.....	Sel....	3	S. Frame	Shaft....	112	56	P. Steel..	Plain...	Ball...	Roller...	2700	34x4	34x4

[3]2, 3 or 4 passengers. [4]3 or 4 passengers.

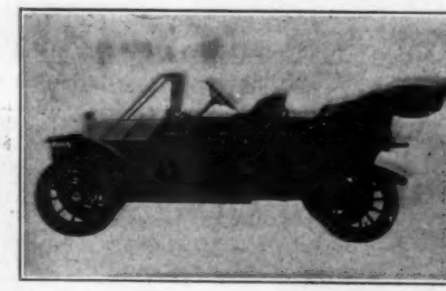
WARREN-DETROIT "30"—Warren Motor Car Co., Detroit, Mich.
E-M-F "30"—E-M-F Company, Detroit, Mich.
THOMAS "FLYER"—E. R. Thomas Motor Co., Buffalo, N. Y.
VELIE—Velie Motor Vehicle Company, Moline, Ill.
WESTCOTT—Westcott Motor Car Company, Richmond, Ind.



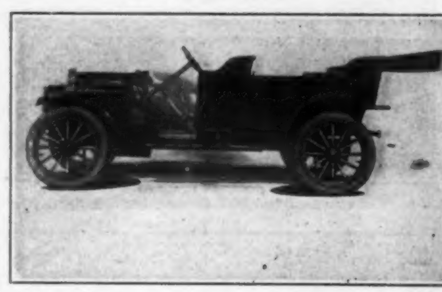
Haynes five-passenger touring car



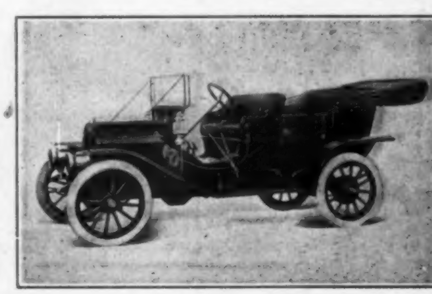
Warren-Detroit "30" fore-door touring car



Velie fore-door type touring car with top and windshield



Westcott standard type of touring car



E-M-F "30" touring car

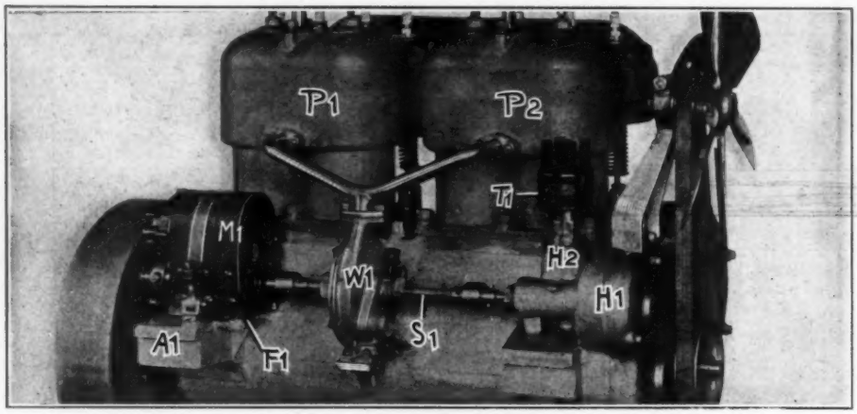


Fig. 20—Example of Velie work, presenting magneto and water pump drive

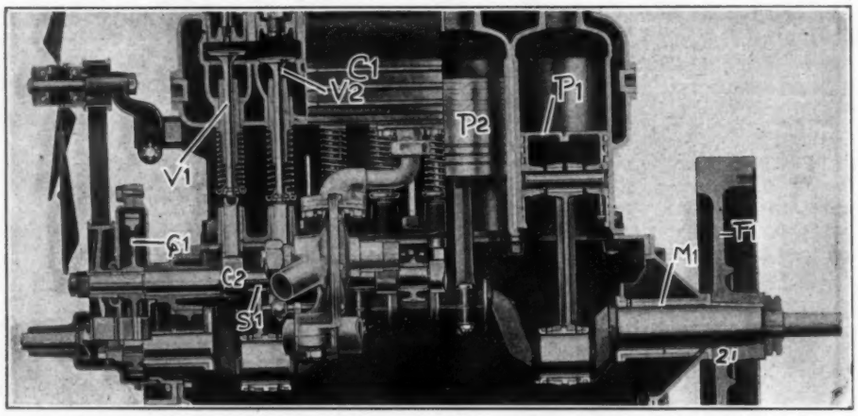


Fig. 21—Flanders "20" motor in part section, to show details and crankshaft

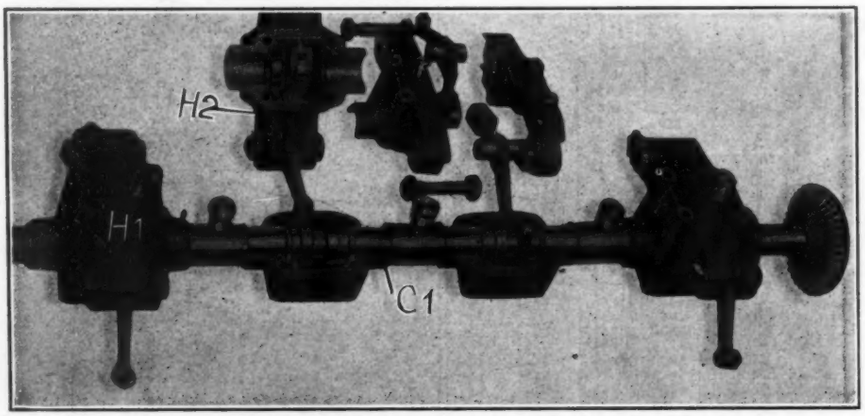


Fig. 22—Overhead camshaft construction of the Jackson motor

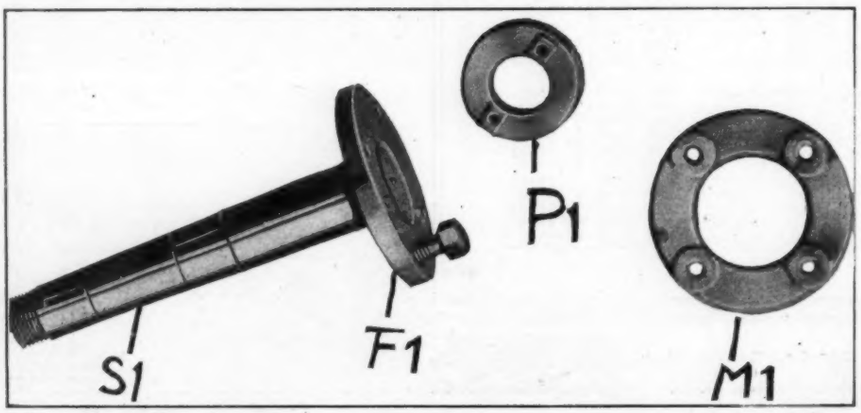


Fig. 23—A very nice detail of the universal magneto drive in the Model M Thomas motor

lower half is extended E1 for the accommodation of the lubricating oil. Other details of unusual interest will appear to the discriminating reader.

Westcott

Referring to Fig. 19 of the Westcott 4-cylinder water-cooled motor, details of which are extended in the accompanying tabulation, the magneto M1 is located on an extension E1 of the crankcase, forming a part of the motor support S1 and the magneto is driven by a shaft from a gear in the housing H1, and the timer T1 is also driven from a gear out of the same housing; the shape of the casting below is such as to accommodate the oil pump drive and the shrouded pulley P1 for the fan belt is pressed up on the end of the crankshaft. The carbureter is located on the opposite side, leaving ample room for the breather B1. The rear motor arm S2 comes out as close to the flywheel F1 as possible, so that the gyroscopic action of the flywheel member is taken care of without introducing crank arm moments. In many other respects the motor presents evidences of designing refinement.

Velie

Referring to Fig 20 of the 4-cylinder water-cooled Velie motor, more complete details of which are given in the accompanying tabulation, the magneto M1 rests on a finished face F1 on the rear motor arm A1 and in common with the water pump W1 is driven by the shaft S1, taking power through a gear in the halftime gear housing H1, and the timer T1 is also driven by a gear on the end of a vertical shaft in the housing H2. The carbureter is located on the opposite side of the motor and the cylinders in pairs P1 and P2 are of neat and symmetrical design, substantially flanged and bolted to finish faces on the crankcase. In other respects the design is conspicuous for clean and simple work.

E-M-F

Referring to Fig. 21 of the 4-cylinder water-cooled E-M-F (Flanders "20") motor, details of which are more completely stated in the accompanying tabulation, the block casting C1 is shown in part section presenting the piston P1 at the downward end of the stroke and the piston P2 at the upward end of the stroke, while at the other end the valve V1 is shown in the open position, and the valve V2 is presented in the closed position. The sections of the cylinders are of even thickness throughout, and the water space is uniform. The details of the valve lifts come out clearly in the illustration showing the cam, C2 integral with the camshaft S1, and at the end of the camshaft the halftime gear C1 is also shown in section. The crankshaft with its connecting rod and main bearings come into view and attention is called to the long main bearing M1 supporting the flywheel F1.

Operation and Care

FASTENING FLYWHEELS TO STAY; SYSTEMATIC LUBRICATION TABLE; CANTOR LECTURES; LETTERS; DON'TS; QUESTIONS; PRACTICAL REPAIRING; CARE AND REPAIR OF TIRES, ETC.

WHILE it is true that flywheels are put on to stay, the fact remains that a large amount of energy is stored up in a mass of this character when it is rotating at a speed of more than a mile in a minute. If the flywheel is fastened to the crankshaft by means of a flange and six holding bolts, there is no chance of it loosening up unless the nuts back off of the bolts, which is not likely to happen if the nuts in turn are locked by means of cotter pins. But these are all matters that the automobilist should look into; if cotter pins are used he should see that they are all in good condition. If locking is done by simply battering up the thread of the nut, the situation is not so healthy, and other means of locking should be taken advantage of.

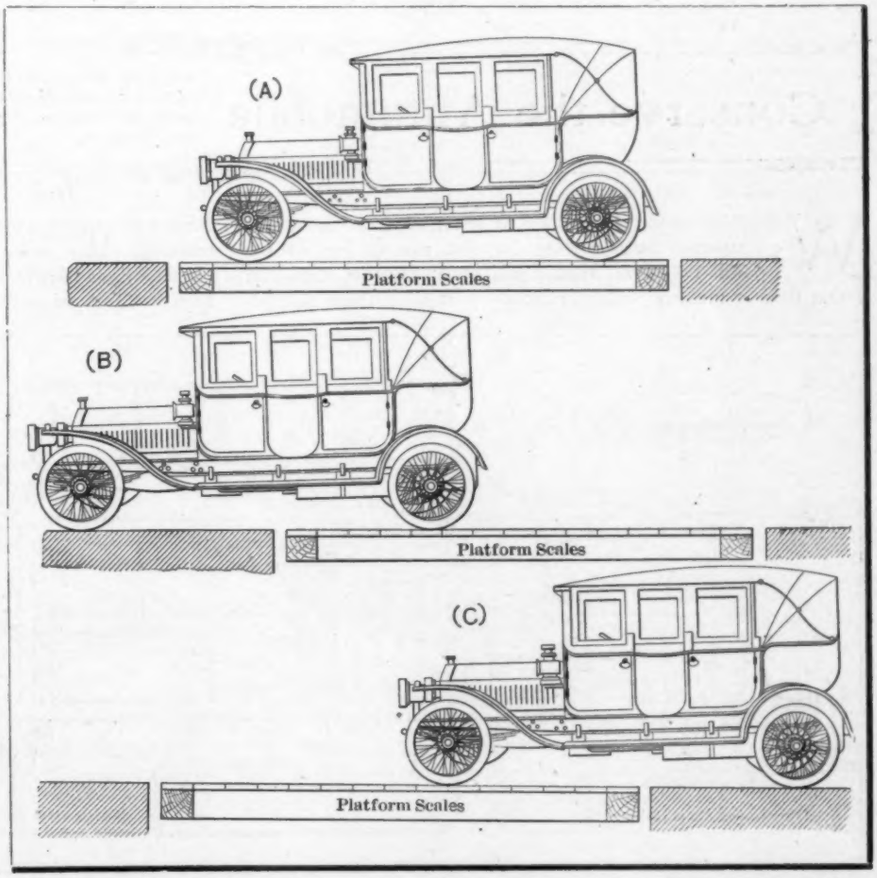
When the flywheel is put on the end of the crankshaft rather than being bolted up on a flange, it remains to see if it is pressed up tight, but unless it is it will work loose. As the flywheel works off it will manifest its condition by a series of knocks; when a strange knock is heard it is a good idea to feel of the flywheel and note if it shakes. If the end of the crankshaft is ground down to a taper of 3-8 inch to the foot, or some other slow taper, the flywheel will press on tightly, and with close grinding to begin with together with a pressure of, perhaps, 15 tons it should stay on; it still remains for the automobilist to examine the flywheel occasionally and see if it is all right.

How to Weigh a Car

Important to Know in Selecting Proper Size Tires

THE best way to ascertain the weight of a car is to take it to the public weigh scales and, if possible, place it so that the four wheels rest on the scales as shown in Fig. A. Sometimes this is not possible owing to the great length of the wheelbase or the shortness of the scales. In any case, the car should be fully equipped with all accessories—spare tires, full tanks, water, oil and gasoline, and each seat that can be occupied filled with a passenger, for reasons that will be made clear. Of course if the car can be weighed on the scales with both front and rear wheels resting on the bridge, to obtain the total weight it is only necessary to add, say, 150 pounds average for the number of passengers the car will carry; but this does not give the weight per axle or per wheel—the important point in determining the proper size tires.

It can first of all be assumed that the combined weight obtained by weighing the car as shown in Fig. B and Fig. C should give the total weight obtained by the method used in Fig. A to within a few pounds; but the weight carried on each of the four wheels is by no means one-fourth of the combined weight. The reason of this is that different bodies are of different weights, and the position of the body and seating capacity has a bearing on the amount of weight thrown on the front and rear wheels. Take, for instance, seven-seated limousine and two-seated runabout bodies that are used on the same chassis. The tires that are just large enough for the latter will be quite inadequate for the former, but the cost of upkeep on the runabout will be decreased if it is fitted with tires that are large enough for the limousine, although if detachable rims are fitted a smaller section tire could be used if desired. However, the cost of the rims would not compensate for the difference in price of the two tires.



Method of weighing a car, with special reference to the fitting of the proper size tires

American Exporters Should Quote Prices in Money of Importing Country—The quotation of prices of American-made automobiles and accessories in the money of the country in which the manufacturer hopes to build up a trade is imperative if the house expects to win the confidence of the foreigner. Quoting prices in American money when advertising goods, even if it is in England, has recently proved to be a great error, attractively written though the advertisement was, in the publications in which it appeared. The effect upon the reader was to prejudice him against the goods by requiring him to calculate what the prices would be in English money.

Where Lies the Mystery?

Lack of Harmony of the Motor to the Gear Ratio More Likely Than Not

POOR performance of some automobiles is due to an overwrought ambition. When an automobilist whets his appetite up to the point where he wants to go at the rate of 60 miles per hour in an automobile that might reasonably be expected to make 40 miles in that time, it stands to reason that the poor automobile must be doctored in some way or other, and it is scarcely to be expected that it will be an all-around good performer. A low gear ratio will make the automobile go faster if the motor will continue at a given speed, but when a hill is approached, or the roadbed is soft, the motor will be at a great disadvantage. Under such conditions it will be necessary to fall back upon the sliding gears, and continual shifting of gears will fall to the lot of the automobilist.

It has been said that the sliding gear mechanism used in automobile work is a most clumsy innovation; so it is. Why, then, fix a set of conditions that will demand the use of this gear so much that it will be worked to death, so to say? Why acquire a taste for speeding on a level if it is to be accompanied by a lot of "sliding" when the roads are a little hummocky, or as the brow of a hill lifts its noble contour above the horizon? Who is to blame for this condition? If automobilists persist in demanding speed on a level, and they will have it, it is quite evident that makers will have to bow to the will of those who have the money to pay for what they want and insist upon having it.

It might be said: Why limit the power of the motor so that trouble of this sort will be experienced? Must it be told that considerations of economy demand that a motor be of the size that will give it a fair load when it is propelling the automobile? Mechanical efficiency and, let it be understood, thermal efficiency as well decrease as the load tapers down, falling to a low level if the loading is less than half of that which the motor is capable of. The proper course, under the circumstances, is to use a size of motor that will afford a good all-around efficiency, but, in order to do so, it is necessary to regulate the gear ratio so that the motor will be capable of pulling the automobile up the hills that beset its path without having to drop into low gear.

If the gear ratio is such that the motor will do the work of propelling the automobile up every 7 per cent. hill and through stretches of soft going without sliding the gears, it follows that it will not shine as a racing automobile on level hard roads. In a sense, when all the considerations are fittingly estimated, the automobile that will be most capable on a grade and reasonably alive on a level hard road is the one for the man who has to count the cost, either of operation from the fuel and tire point of view, or from the standpoint of depreciation as well.

The Slide versus the Poppet Valve

What Hamlet would have said about it

To slide or not to slide? That is the question.
Whether it is wiser in a valve to suffer
Th' external noise of the poppet system,
Or take to sleeves (not arms) against the trouble,
And by back-sliding end it? To slide—to pop
No more; and by a sleeve to say we end
The vices, and the thousand natural shocks
The poppet's heir to—'tis a consummation
Devoutly to be wished. To slip—to slide—
To slide—perchance to heat—ay, there's the rub.

—*Motor News* (Ireland).

Conserve the Automobile

BY THE SYSTEM OF LUBRICATION HERE SHOWN (IF CLOSELY ADHERED TO), IT IS BELIEVED THAT THE LIFE OF THE AUTOMOBILE CAN BE PROLONGED MARVELOUSLY

WHEN an automobilist goes in quest of a car and he is instructed how to care for and run it, one of the points that every maker will try to impress upon him is that the car must be well lubricated. Just what these instructions will mean to the purchaser will depend upon his previous training. If a machinist makes a purchase it is highly improbable that he will be impressed at all; he will know that the mere mention of such an important matter is scarcely sufficient.

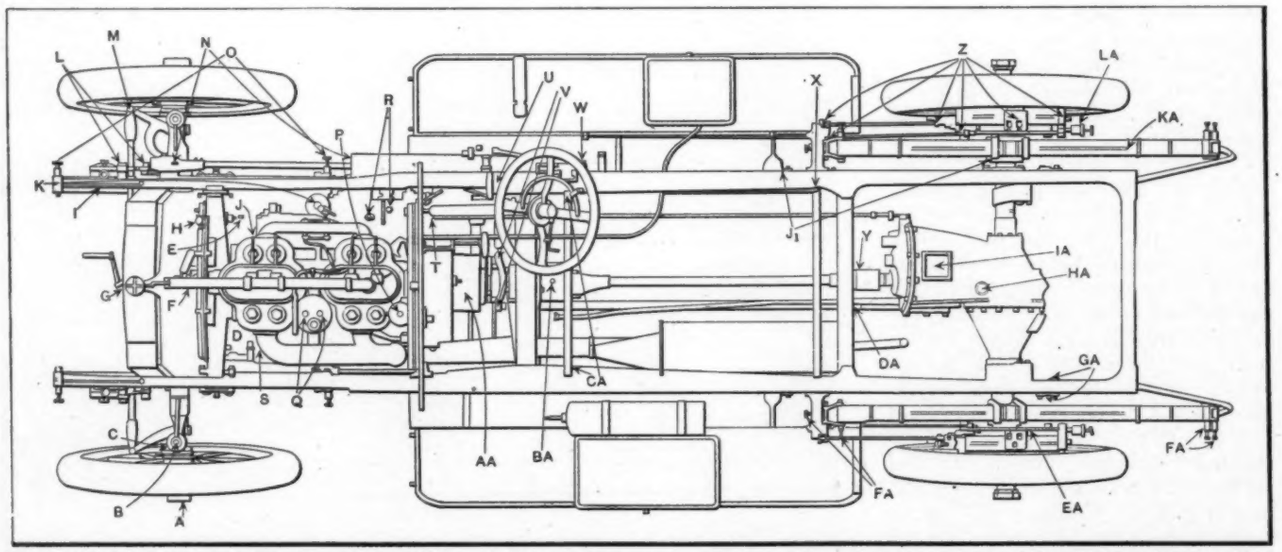


DIAGRAM OF AN AUTOMOBILE SO NUMBERED AS TO COMPARE WITH THE INDEX OF THE TABLE FOR USE IN SYSTEMATICALLY LUBRICATING ALL OF THE BEARINGS

But if the purchaser knows no more about machinery than he may have learned by trying to fix his wife's sewing machine, he will come away sufficiently impressed to make him believe that a squirt can should be emptied at frequent intervals, although it will be all the same to him whether the oil out of the can goes into the bearings or over the exterior surfaces, and he will wonder what all the little holes are for; the places that ought to be protected from the silt of the road by a suitable oiler. The grease cups will look so large to an automobilist of this character that he will wonder if they will ever be emptied.

The real situation is quite different; every place that has relative motion, as every joint, and bearing, even unto the plates of the springs, must be lubricated at frequent intervals or the automobile will soon fall into a state of disuse; at all events it will soon make so much noise that the owner will lose his taste for it. But all of the bearings do not have to be lubricated with the same frequency, and the quality of the lubricant does not have to be the same in each location. Of course, it will be a good idea to use a good grade of lubricating oil in any case, but it will not be necessary to use a high-priced cylinder oil in the little bearings around the chassis, as the brakeshaft journals, etc. In certain places it will be proper to employ a good grease; the consistency of the same to be varied to suit the time of the year and the place of use. Graphite may also have a use in this work, as for illustration, it is good to use with the grease in lubricating the side-chains and in like service. The tabulation, as here given, tells the days of the months, for a whole year, on which to lubricate the various bearings, and, while it is true that this diagram will not serve for all makes of automobiles, the fact remains that, with but slight departure, the automobilist may follow the outline suggested, and, if he will take the pains to employ the system here given, he may be sure that his automobile will run twice as long, at least, as it will if he merely does the work on a haphazard basis.

Reminder to the Automobilist When and Where to Lubricate

No.	LOCATION	*	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
A	Front wheel hub caps	G	7	4	4	1	6	3	1	5	2	7	4	2
B	Steering knuckle bolts	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	9,23
C	Front wheel bearings	O	7	4	4	1	6	3	1	5	2	7	4	2
D	Magneto shaft coupling	G	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23,30	7,21	4,18	2,16,30
E	Water pump shaft coupling	G	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
F	Fan bearing oiler	O	7,14,21, 28	4,11,18, 25	4,11,18, 25	1,8,15, 22,29	6,13,20, 27	3,10,17, 24	1,8,15, 22,29	5,12,19, 26	2,9,16, 23,30	7,14,21, 28	4,11,18, 25	2,9,16, 23,30
G	Starting crank bearing	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	19,23
H	Timing gear compartment	O	14	11	11	15	13	17	15	12	16	14	18	16
I	Spring leaves	G	28	25	25	29	27	24	29	26	30	28	25	30
J	Valve rod guides	O	7,14,21, 28	4,11,18, 25	4,11,18, 25	1,8,15, 22,29	6,13,20, 27	3,10,17, 24	1,8,15, 22,29	5,12,19, 26	2,9,16, 23,30	7,14,21, 28	4,11,18, 25	2,9,16, 23,30
K	Air valve stem	O	21	18	18	15	13	24	22	19	16	14	25	23
L	Shock absorber studs	O	7	4	4	1	13	10	8	5	2	14	11	9
M	Steering cross tube greasers	G	7,14,21 28	4,11,18, 25	4,11,18, 25	1,8,15, 22,29	6,13,20, 27	3,10,17, 24	1,8,15, 22,29	5,12,19, 26	2,9,16, 23,30	7,14,21, 28	4,11,18, 25	2,9,16, 23,30
N	Steering connecting rod greasers	G	21	18	18	15	13	24	22	19	16	14	25	23
O	Spring bolt greasers	G	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
P	Commutator oiler and greaser	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	9,23
Q	Crank case filler and oil tank	O	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
R	Steering case greasers	G	7	4	4	1	6	3	1	5	2	7	4	2
S	Magneto oil cups and wells	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	9,23
T	Accelerator pedal joints	O	21	18	18	15	13	24	22	19	16	14	25	23
U	Brake pedal bearing	O	7,14,21, 28	4,11,18, 25	4,11,18, 25	1,8,15, 22,29	6,13,20, 27	3,10,17, 24	1,8,15, 22,29	5,12,19, 26	2,9,16, 23,30	7,14,21, 28	4,11,18, 25	2,9,16, 23,30
V	Clutch pedal bearings	O	14,28	11,25	11,23	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
W	Brake and gear lever ratchets	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	9,23
X	Brake shaft and connections	O	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
Y	Rear universal joints	G	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
Z	Brake fittings and connections	O	7,14,21, 28	4,11,18, 25	4,11,18, 25	1,8,15, 22,29	6,13,20, 27	3,10,17, 24	1,8,15, 22,29	5,12,19, 26	2,9,16, 23,30	7,14,21, 28	4,11,18, 25	2,9,16, 23,30
AA	Plate clutch housing	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	9,23
BA	Front universal joint	G	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
CA	Gear and brake lever shaft bearings	O	7,21	4,18	4,18	1,15,29	13,27	10,24	8,22	5,19	2,16,30	14,28	11,25	9,23
DA	Gear shifter shaft	O	14	11	11	15	13	17	15	12	16	14	18	16
EA	Internal brake cam oilers	O	21	25	25	22	20	24	22	26	23	21	25	16
FA	Rear spring bolt greasers	G	14,28	11,25	11,25	8,22	6,20	3,17	1,15,29	12,26	9,23	7,21	4,18	2,16,30
GA	Shock absorber bearing studs	O	7	4	4	1	13	10	8	5	2	14	11	9
HA	Differential housing	O	7		4		13		8		2		11	
IA	Transmission case	G		4		1		10		5		14		9
J1	Rear brace rod connections	O	14	11	11	15	13	17	15	12	16	14	18	16
KA	Spring leaves	G	21	18	18	15	13	24	22	19	16	14	25	23
LA	Rear axle outside bearing greasers	G	7,14,21, 28	4,11,18, 25	4,11,18, 25	1,8,15, 22,29	6,13,20, 27	3,10,17, 24	1,8,15, 22,29	5,12,19, 26	2,9,16, 23,30	7,14,21, 28	4,11,18, 25	2,9,16, 23,30

*O—Oil (bold face type). G—Grease.

Cantor Lectures on Motors

PROFESSOR W. WATSON, D.S.C., F.R.S., DELIVERED A SERIES OF LECTURES ON THE GASOLINE MOTOR, OF WHICH THIS IS THE EIGHTH INSTALLMENT—BY PERMISSION OF THE ROYAL SOCIETY OF ARTS

TAKING the case where there is no compression, and taking the initial volume of the mixture as unity, and representing its state by the point, A, we suppose that by the burning of the petrol 1,150 foot-pounds of heat energy are communicated to the gas, the volume remaining constant, so that the condition of the contents of the cylinder at the end of combustion is represented by the point, E. Next, let the piston travel out, doing work, till the gases have expanded to twice their original volume, *i. e.*, till the point, F, is reached; the exhaust valve is then supposed to open, so that the pressure falls to atmospheric pressure, represented by the point, G, and the piston, on the return stroke, expels the gases, and thus we get back to the point, A. The work done during this cycle is represented by the area of the figure A E F G.

Next, starting with the same quantity of mixture at the same pressure, represented by the point, A, let it be compressed adiabatically, *i. e.*, without loss of heat, to the point, B. Then, the piston remaining stationary, let the mixture be fired, so that 1,150 foot-pounds of heat energy are again communicated to the gas. The pressure will rise to the point, C. Then, allowing the piston to move out, the gases will expand, doing work on the piston, till the original volume is reached, that is, till we come to the point, D. The exhaust valve is then opened, and the products of combustion are allowed to escape. The work done during the cycle is represented by the area of the figure, A B C D, and a mere glance is sufficient to show that the area of this figure is very much greater than the area of the figure, A E F G, or, in other words, the work done by the engine is greater, and, since the energy supplied in the form of fuel is the same in the two cases, it follows that the efficiency, in the case of the compression cycle, is considerably greater than in the case of the non-compression cycle. The actual value of the work done in the compression cycle is 410 foot-pounds, so that the efficiency is 410 ÷ 1150 or 0.36. In the case of the non-compression cycle, the work done is 205 foot-pounds, and the efficiency is 0.18.

It will be observed, further, that if the expansion in the case of the compression cycle were carried to twice the original volume, as was done in the case of the non-compression cycle, an additional amount of work, represented by the area, D H G A, would be obtained, and that this additional work would be about two-thirds of the whole work obtained in the non-compression cycle.

If we consider an ideal engine, working on the Otto cycle, in which there are no thermal losses due to conduction and radiation, and in which the gas in the cylinder, usually called the working fluid, has at all temperatures the same properties as has air at ordinary temperatures, then the efficiency of such an engine can be at once calculated if we know the amount of the compression. Thus, if r is the ratio of the original volume of the charge before compression to the volume after compression, that is, is the ratio of the stroke volume plus the volume of the combustion space to the volume of the combustion space, the efficiency is given by

$$y = 1 - \left(\frac{1}{r}\right)^{0.408}$$

The quantity, r, is called the compression ratio, and some values of the efficiency calculated by this formula are given in the following table:

AIR STANDARD EFFICIENCY

Value of r.	Efficiency
2	.25
3	.36
4	.43
5	.48
6	.52
10	.61
100	.85

In practice, the compression ratios of petrol engines lie between 3.5 and 5, generally about 4.

Some actual measurements of efficiency are shown in Fig. 30, which were obtained from a four-cylinder engine having a bore of 85 millimeters and a stroke of 120 millimeters, the compression ratio being 4.71. The full line curve corresponds to a speed of about 1,300 revolutions per minute. The curve marked with small dots to a speed of 1,100, and the curve marked with dashes to a speed of 700 revolutions per minute.

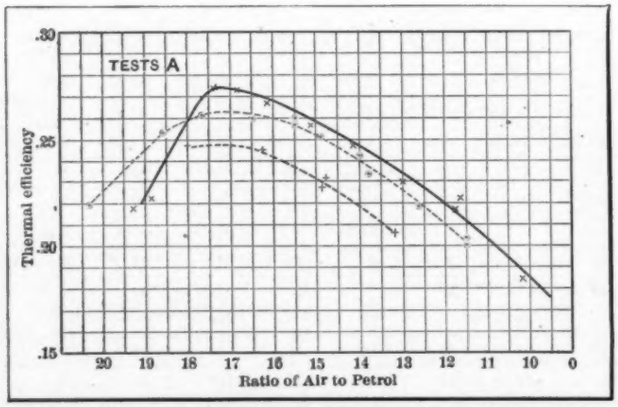


Fig. 30—Indicator diagram showing actual measurements of thermal efficiency obtained from a four-cylinder engine at varying speeds

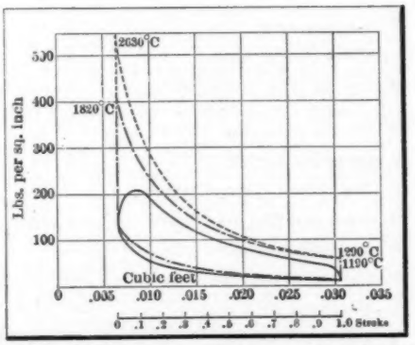


Fig. 31—Showing efficiency with heat supply per cycle of 962 foot pounds

It will be observed that, except with very weak mixtures, the efficiency increases with the speed. Considering the measurements made at the highest speed, and starting with the weakest mixture that will fire, which is about 19 of air to one of petrol, the efficiency is about 0.22. As the mixture gets richer, the efficiency rapidly increases, and reaches a maximum of 0.276 for 17 parts of air to 1 of petrol. After this the efficiency steadily decreases as the strength of the mixture increases. It is important to notice that the maximum efficiency is not obtained with the exact amount of air required to give complete combustion, that is with 14 of air to 1 of petrol; increased efficiency is obtained by working with weaker mixtures, that is with mixtures containing an excess of oxygen. For mixtures richer than 1 of petrol and 14 of air there is a certain amount of combustible gas (CO, H and CH_4) in the exhaust, and hence some of the energy of the fuel is wasted owing to incomplete combustion. This is a point to which I shall return later.

Since only about 27 per cent. of the heat energy supplied in the

fuel is converted into work, it follows that the remaining 73 per cent. is wasted, and I now wish to consider what becomes of this wasted heat, and if it is practicable to avoid such loss to any great extent. The heat which is not converted into work is either communicated to the walls of the cylinder and hence to the jacket water, or escapes in the exhaust, the gases of which are at a very high temperature. We require to separate the losses of heat into two parts, namely, that communicated to the cylinder walls during the compression and working stroke, and the remainder, which represents the sensible heat of the exhaust gases at the end of the working stroke. The first of these (*a*), namely, the heat lost to the cylinder walls during the working stroke, is pure waste, and in every way it is advantageous to reduce it to a minimum. The second, (*b*) namely, the heat represented by the hot exhaust gases; although it represents a waste as far as the conversion of heat energy into work is concerned, is quite unpreventable so long as the engine works on the Otto cycle, in which the expansion stops when the volume is equal to the initial volume of the uncompressed charge. To what extent we may hope to reduce it by using a different cycle of operations will be discussed later on. Now it is quite impossible in a four-cycle engine to separate experimentally the heat losses into the two parts, *a* and *b*, for the reason that the jacket water receives quite a large proportion of the heat from the exhaust gases. This is due to the fact that the hot exhaust gases remain in contact with the cylinder walls throughout the exhaust stroke. Further, in order to prevent the burning of the exhaust valve and its seating, the part of the exhaust passage near the valve is always well waterjacketed. Thus, on both these accounts, much of the heat of the exhaust gases is communicated to the jacket water. We can, however, form some idea of the relative magnitudes of the losses, *a* and *b*, by studying the action of an ideal engine, in which the walls of the cylinder are supposed to be impervious to heat, and hence there is no loss of heat from the working fluid to the walls. In such an ideal engine we can calculate the heat contained in the exhaust, and then the difference between the total quantity of heat lost in the actual engine, and the quantity of heat lost in the exhaust of the ideal engine will give us some idea of the quantity of heat lost owing to conduction in the actual engine.

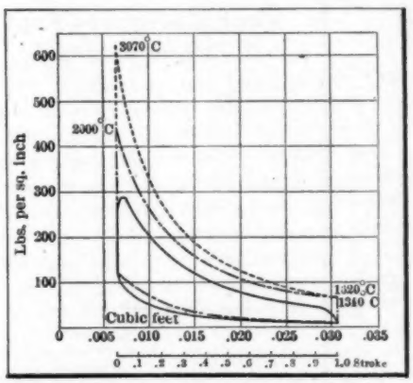


Fig. 32—Showing efficiency with heat supply per cycle of 1150 foot pounds

When considering the ideal engine we may either suppose that the working fluid has also the ideal property of having the same specific heat at all temperatures, when it is usual to refer to the engine as one working on the air cycle, or we may suppose that the properties of the working fluid are identical with those of the gases which are actually present in the cylinder of an engine. In this case it will be necessary to allow for the fact that the specific heat of such gases increases as the temperature rises.

In the air-cycle engine the efficiency will vary with the compression ratio, as already mentioned, but will not vary with the amount of heat supplied per stroke. In the case of the variable specific heat ideal engine, the efficiency will vary with the compression ratio to almost exactly (in reality a very little less) the same extent as in the case of the air cycle. Owing, however, to the increase in specific heat with temperature the efficiency will vary with the heat supply per cycle, for the temperature reached at the end of the combustion will depend on this quantity, *i. e.*, on the strength of mixture in the charge.

In Figs. 31, 32, 33 are shown for three different amounts of heat supply per cycle, the three indicator diagrams corresponding to—(1) an ideal engine working on the air-cycle; (2) an ideal engine working on the variable specific heat cycle, and (3) an indicator diagram taken from an actual engine, in each case the compression ratio being 4.7. In Fig. 31 the heat supply per cycle is 962 foot-pounds, which corresponds to the use of a mixture containing 17.4 parts of air to 1 of petrol. The following table gives the manner in which the heat supply is utilized in the three cycles:

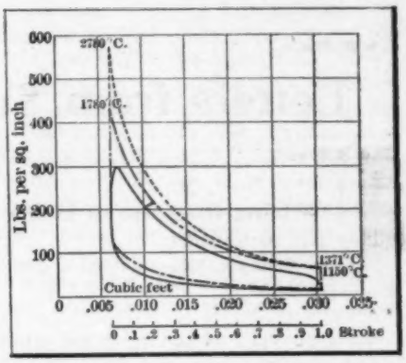


Fig. 33—Showing efficiency with heat supply per cycle of 1027 foot pounds

	Efficiency	Mean effective pressure lbs. per sq. in.	Heat converted into work per cycle ft. lbs.	Heat rejected per cycle ft. lbs.
Ideal engine, air cycle.....	.463	128	445	517
Ideal engine, variable specific heat cycle.....	.367	102	352	610
Actual engine.....	.275	77	265	697

Thus it appears that while an ideal engine, in which there are no thermal losses due to loss of heat to the cylinder walls, would reject in the exhaust 610 foot-pounds the actual engine rejects 697 foot-pounds. Of this 697 foot-pounds, part is lost to the walls of the cylinder, and we see that such loss probably amounts to about 87 foot-pounds per cycle.

In Fig. 32 the heat supply per cycle is 1,150 foot-pounds, which corresponds to a mixture containing 14.1 of air to 1 of petrol, and the heat supply is accounted for as follows:

	Efficiency	Mean effective pressure lbs. per sq. in.	Heat converted into work per cycle ft. lbs.	Heat rejected per cycle ft. lbs.
Ideal engine, air cycle.....	.463	153	530	620
Ideal engine, variable specific heat cycle.....	.356	118	410	740
Actual engine.....	.248	84	285	865

In this case the entire loss in the actual engine is 125 foot-pounds per cycle.

In Fig. 33 the heat supply per cycle is 1,027 foot-pounds. This corresponds to the heat actually developed in the cylinder when a mixture containing 10.1 parts of air to 1 of petrol is used. The calorific value of the fuel is much greater than 1,027 foot-pounds, but with this limited supply of air the petrol is only partly burnt, a large proportion of carbon monoxide, hydrogen and methane being present in the exhaust. The heat developed by the combustion that actually takes place is accounted for as follows:

	Efficiency	Mean effective pressure lbs per sq in.	Heat converted into work per cycle ft. lbs.	Heat rejected per cycle ft. lbs.
Ideal engine, air cycle.....	.463	137	475	552
Ideal engine, variable specific heat cycle.....	.381	113	390	637
Actual engine.....	.289	86	297	730

In this case the extra loss in the actual engine amounts to 93 foot-pounds per cycle.

In the latest type of Blériot aeroplane, as exhibited at the recent aviation show in Paris, the designer takes distance from the revolving type of motor, having equipped his machine with a four-cylinder Gregoire-Gyp motor, which is furthermore placed upside down so as to lower the center of gravity for the whole structure and incidentally gaining whatever improvement in balancing may result from having reciprocating parts work against gravity instead of with this force during the power stroke.—*Allgemeine Automobil-Zeitung.*

Letters from Subscribers

THIS DEPARTMENT IS DEVOTED TO THE ANSWERING OF LETTERS FROM SUBSCRIBERS ON ANY SUBJECT RELATED TO THE RUNNING OF AUTOMOBILES

Wiring Diagram of Delco Distributor

Editor THE AUTOMOBILE:

[2,450]—Will you please publish a wiring diagram of the Delco ignition system? SUBSCRIBER.

Jersey City, N. J.

Using six cells of battery in the series, arranged for a four-cylinder motor, connected up to four spark plugs, the wiring diagram is as shown in Fig. 1.

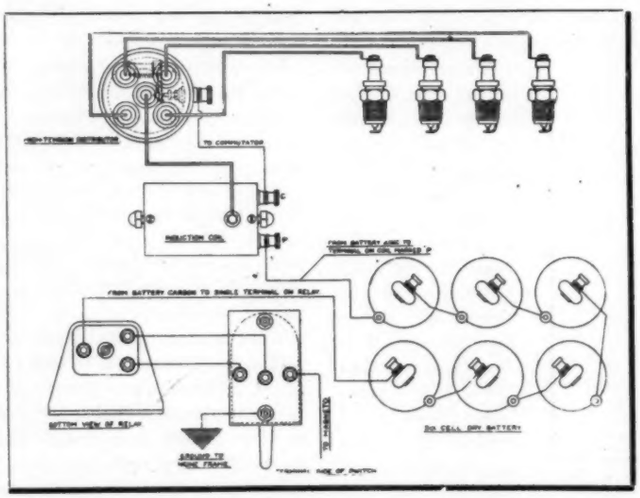


Fig. 1—Illustrating the method of wiring in a Delco Ignition system

Refinement in Design Readily Noted

Editor THE AUTOMOBILE:

[2,451]—I have had some experience as a designer, but I do not understand what is meant by ultra-refinement, or to what extent motors and other parts of automobiles can be made better than they are, taking them as they may be found in the many examples of the present day. Will you give a single example, illustrating the difference between a real refinement and a design that might be classed as indifferent? Kindly make the comparison as plain as possible, so that it will appeal at once to the reader. PREDESINGER.

Detroit, Mich.

Referring to Fig. 2 of a cylinder and to the metal around the seat of the valve, note that it is not of uniform thickness, being bunched at A and quite thin at B. Now examine another cylinder design as depicted in Fig. 3, observe that the metal of the cylinder around the valve is uniform in thickness and that the water J1 and J2 is in quantity, with free circulation all around. Also observe that the water connection at the top J3 is in good volume. A moment's observation, taking in the two designs, will suffice for your purpose.

A Useful Tool for Magneto Work

Editor THE AUTOMOBILE:

[2,452]—I recently wanted to set the make and break of my magneto and tighten up some nut on it, but found the ordinary small adjustable wrench was useless for the purpose. Is there any spanner designed for this especial use?

R. C. JONES.

Pittsburg, Pa.

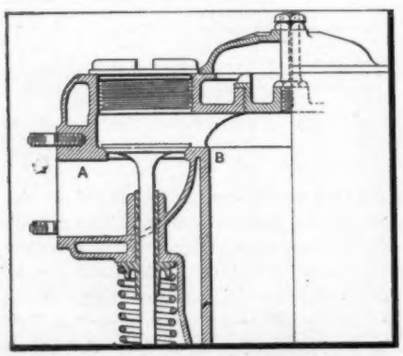


Fig. 2—Showing bunched metal on one side of valve and water cooling on the other

A spanner is usually supplied by makers of magnetos, but if you wish to make one it is a very simple matter. Out of a piece of 3-16 inch steel as shown in Fig. 4 a spanner can be cut with a hacksaw and filed up to shape to the sizes indicated, which are the usual ones for nuts and bolts used for this work. It is a tool that can be carried about in the pocket without inconvenience, and one that will allow of getting at ordinarily inaccessible places without much trouble, incidentally avoiding the possibility of a set of badly barked knuckles and the consequent profanity.

Alcohol Mixtures Kept at Proper Strength

Editor THE AUTOMOBILE:

[2,453]—When alcohol is used with water in the radiator of a motor and heating up is enough to boil the solution, the question is, does the alcohol boil off, and if so, how can one determine when to strengthen the solution in order to be sure that the same will not fall below the desired point?

Brooklyn, N. Y. C. F. G.

According to law, denatured alcohol is the "grain alcohol of commerce rendered unfit for beverages." The freezing point of this alcohol is about 160 degrees Fahrenheit. When added to water in various proportions it lowers the freezing point of the water. An approximation of the freezing points of various proportions of water and denatured alcohol is given below:

FREEZING POINT OF DILUTED DENATURED ALCOHOL

Proportion of water in gallons	Proportion of denatured alcohol in quarts	Freezing point in degrees Fahrenheit
1	1	10
1	1.5	5
1	2.5	—20
1	4	—35

NOTE.—The solution must be balanced from time to time, maintaining the same at the proper level. If it is safe to employ a mixture holding 2.5 quarts of denatured alcohol to the gallon of water it is necessary to maintain this level.

A very simple way of observing the relation of alcohol to water is to mix, say, 2 1-2 quarts of denatured alcohol with 1 gallon of water and then by means of a weighted float with a stem on it find out how low the float sinks in the solution and mark this point on the stem as shown in the illustration (Fig. 6). With a good-sized cork, a long, slender stick of wood and a couple of washers it would be possible to make a measuring instrument in five minutes that will serve every purpose. Calibrate the instrument by finding out how low it will sink in the solution and mark the place. After this all that has to be done is to draw off some of the solution from the radia-

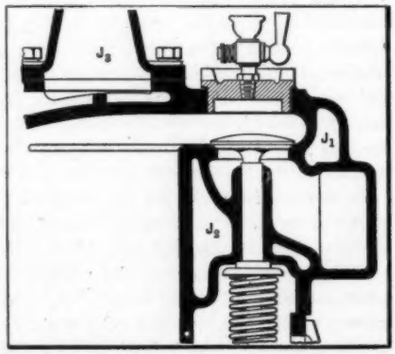


Fig. 3—Showing water cooling around valve head with the metal of uniform thickness

tor in a bucket and drop the instrument into the liquid, noting how low it will sink. If it does not sink down to the mark, add alcohol until it will; if it sinks below the mark, add water to float it up to the same.

Some Pointers as to Electrically Lighting a Car

Editor THE AUTOMOBILE:

[2,454]—I am desirous of equipping my car with electric light throughout, and would be obliged if you will answer the following queries in order that I may form an idea as to what the cost of operation will be:

1. How should the wiring be carried out for a complete equipment?

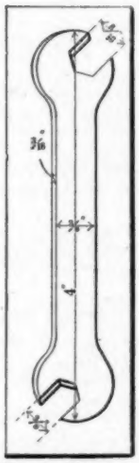


Fig. 4—Wrench for magneto

2. What capacity storage battery would give the best results?

3. What would be the consumption of current per lamp per ampere hour?

4. Is it a simple matter to fit a lighting dynamo?

New York. LIMOUSINE.

1. Fig. 5 shows how the wiring should be carried out, with a central switch L on the dash. The battery M can be carried in a box on the running board, but of course it can be placed anywhere, although the position will depend upon the length of wiring. The different fittings—A, headlights; B, side lamps; H, electric horn; J, pillar lights for lubricators and speedometer; F, cigar lighter; D, interior light; C, tail lamp—can all be run together, the inside lights being controlled by the switch E and the horn by switch I.

2. The capacity of the storage battery depends upon the candlepower of the lamps. Six-volt lamps are the ones usually employed and are the easiest to replace if broken, as this size is usually carried in stock. The headlights could be fitted with 16-candlepower lamps, the side lamps with 4 candlepower, the tail lamp with 2 candlepower and the interior with 4 candlepower lamps.

3. The consumption of the above would be as follows if tungsten lamps were used: The 2-candlepower lamps consume 0.4 ampere per hour; the 4, 0.8 ampere per hour, and the 16-candlepower, 3.2 amperes per hour. It will be noticed that the amperage is just double the candlepower. The amount of current consumed by the horn and other fittings is but slight. Carbon lamps, although much cheaper than the metal filament type, burn about three times the amount of current that is consumed by the latter.

4. Yes, and in some makes it can be used to charge the storage battery while not being used for lighting purposes.

A Baker's Dozen of Serious Motor Happenings

Editor THE AUTOMOBILE:

[2,455]—My motor is of the T-type. The timing gears are noisy, no doubt from wear. Would you advise getting new ones from the builders of motor, or having spiral gears made? If so, where could I have them made, and what should the price be? Also, what do you consider the best material for the gears? The timing of the valves is marked out on flywheel. I have the valves set so that when marks are at proper place there is no clearance between slider and valve stem, and valve is ready to open. This leaves quite a bit of clearance when valves are closed and makes noise. Is there any way this clearance can be taken up without changing timing? The valve sliders are square and oil works out, running down crankcase. Would grinding off corners of sliders allow oil to drain back, or would more be thrown out? Some makers are using telescoping sleeves to enclose valve springs, guides and sliders. Do you think they would help me? How are they made?

I have a Stromberg carbureter. Do you think a mechanical device used in intake manifold to break up mixture would increase power and smooth running, and decrease gasoline used?

Hammondsport, N. Y. I. J. BRUNDAGE.

1. A new set of gears might reduce the noise in the half-time system; they do not have to be spiral if they are well made.

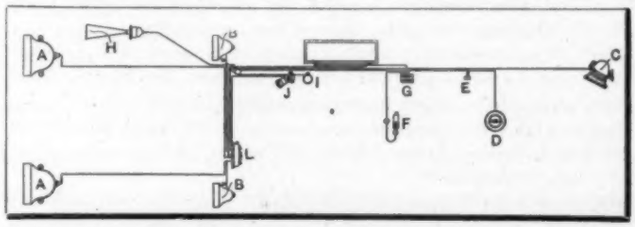


Fig. 5—Diagram showing method of wiring a car for electric lighting

The cost will certainly be the lowest if the old gears are replaced from interchangeable stock which the maker should have.

2. Halftime gears are sometimes made of cast gray iron in order to keep the noise down. They may be of any good grade of gear steel, and to render them noiseless a ring of Babbit may be cast around inside of the flange, adhering to the inner surface of the teeth base. After this band is cast in, the gears may be set up in centers, and the Babbitt may then be turned down to any desired smooth contour.

3. There should be a little clearance between the lift of the valve and the stem in order to make sure that the valves will seat. The exact amount of this clearance will depend upon the diameter of the cam roller; reduce it to the minimum possible consistent with the seating of the valve. You will understand that there will be no way of reducing this clearance by a certain way as indicated by the diameter of the roller, unless a new roller is substituted, the latter of a reduced diameter, which is equal to redesigning the motor in numerous particulars, and this may be too much of an undertaking.

4. If oil sneaks up the valve lifts and crawls out upon the ledges above, cut a recess around the inner wall of the outer extremity of the guide and clap a washer down on top of it, making the same with a hole that will hug the lift. When the oil crawls up and touches the washer it will fall back into the cavity instead of crawling out upon the ledge.

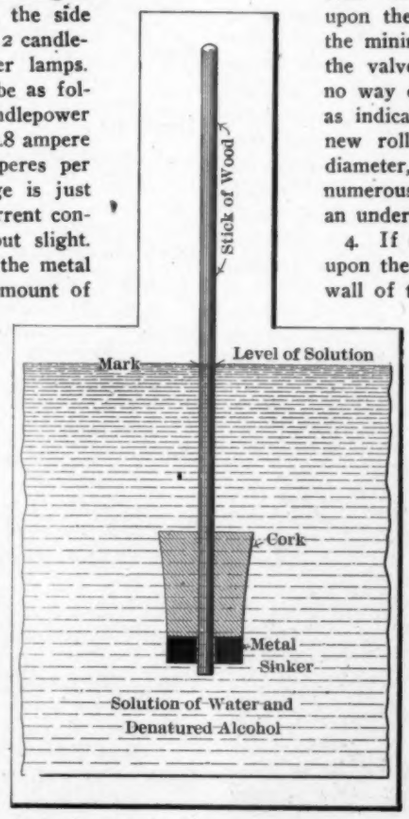


Fig. 6—Instrument to determine proper proportions of alcohol and water in anti-freezing mixture

5. Telescoping sleeves are advantageous, nor should they be hard to make. You might take two lengths of brass or copper tubing so sized as to telescope each other, and after inserting them into place, prevent them from dropping down by drilling a hole through and slipping a long cotter pin clear through, thereby clinching back the ends.

6. Adjust the Stromberg carbureter so that it will give you a mixture that will not heat your motor too much when it is running slow. You should have no trouble at all after you make the proper adjustments. The level of gasoline in the jet on this particular carbureter is very easily adjusted, and decreasing the level in the float chamber may have the desired effect.

Don'ts for the Autoist

THE BURDEN OF THIS PLAINT IS IN THE NATURE OF SOME INJUNCTIONS FOR THE GOOD OF THE SERVICE AND THE EDIFICATION OF USERS, OR THOSE WHO MAY JOIN THE RANKS

Don't set up a wail of woe if you run on a deflated tire for a few feet only and then have to visit the tire maker.

Don't try to achieve fame in an automobile at the rate of 60 miles per hour; you might have to wear splints.

Don't be seized with hysteria if the brasses of your motor melt out after they put up with the abuse which comes from a shortage of lubricating oil for three hours.

Don't shoot down your intelligence in cold blood; this is what you do when you abuse your chauffeur for keeping your automobile in good working order.

Don't exhibit grief if you purchase a second-hand automobile and, failing to examine it, discover that it is a white elephant instead.

Don't write an advertisement entitled "News for investors" if you wish to dispose of a second-hand automobile that is positively useless; just say "Bait for suckers" instead.

Don't be less than the shrewd investor who will first consult his needs and then select an automobile to fill them.

Don't spend money on the patching of bad roads; build good roads instead.

Don't forget that good road-building requires science, skill and money.

Don't live on a bad road; it is a sign that you will always remain poor.

Don't overlook the fact that automobilists are men of affairs.

Don't argue against the automobile; it runs out of doors; fresh air is also to be found in the very places that it will be found in.

Don't forget that man is not a fish; he needs air; water is only a solvent.

Don't hover around a drawing room absorbing silly conversation; go out in an automobile and absorb oxygen; it will do you infinitely more good.

Don't be a reservation Indian; the noble red man fell into droll ways directly when he dropped his practice of hunting around for enough to eat and fresh air.

Don't pay your tailor to make you look like a man; get an automobile and watch Nature re-shape you into one whom the tailor will not have to pad.

Don't under-estimate the value of the crisp set of brains that nestle under the hair of the man who rides daily in an automobile; you would not have the slightest show in a mental tussle with him.

Don't hang around a sanitarium to be weaned; if you have the drinking habit and you desire to stop fighting, get an autobile and have the cobwebs swept away.

Don't have melancholia if you are a banker and you want to unload mining stock, but cannot; fall into line; buy an automobile and forget it.

Don't be a chucklehead; supposing it is true that the pianos you make are going but slowly, do you blace 'em? You ride in a big locomotive yourself, and you enjoy it too.

Don't go to a drug store for beauty dope; it rubs off; ozone, as it greets you from the four winds, as you brace to the breeze in a tonneau, is indelible.

Don't get mixed up in the financial ditch with a lot of high-priced millinery and other trappings; an automobile is much less expensive and it has more class; moreover, it is of real value in a dozen ways that feathers are as strangers to.

Don't disregard the traditional aid to sobriety as the "gold cure"; apply it in the purchase of an automobile, backing sobriety of judgment; get a good automobile.

Don't be overwhelmed by the force of acccuracy as it is set forth by the salesman; let him out a link on the road to proof of the pudding.

Don't put a damper upon the salesman who has the courage of his convictions; let him show you what he can do.

Don't dissolve the parliament of the senses or be content with a half-repair job at double-cost; convene the parliament and pass an act of censure if necessary.

Don't take the wind out of the sails of a good chauffeur; if he wants a tire gauge for purposes of economy, get one for him.

Don't take to a "safety razor" to work an economy sufficient to perpetuate a fallacy; if the chauffeur fails to help you out, fire him.

Don't imitate a barber when a "prospective" accepts your suggestion to see what your car is like; he neither wants a close shave, nor does he desire to be talked to death—send a dumb demonstrator.

Don't snort with disgust at the service your tires are giving; inflate them and they will last three times as long.

Don't bind your thoughts to make them small like the Chinese ladies' feet.

Humors of Aviation

Parisians Have Devised an "Easy-Drop" Garment for Sky Sailors

RUDYARD KIPLING wants aviators to don pneumatic clothes. Henry Norman insists that they should be provided with a parachute device. Capping the climax, Paris combines the pneumatic clothes and the parachute in the wonderful garment for aviators shown in the accompanying illustration. The moment the aeroplane strikes the unfriendly earth with some force, the shock releases compressed air and inflates the vestment, or if the aviator choose to abandon his craft in midair, he jumps, spreading his arms, and there is the parachute, ready to transform itself into a ball of air and guaranteed to land the daring airman with the most durable portions of his anatomy underneath.

Front and side views of the latest Parisian style of aviation apparel—the parachute dress

It Stands to Reason

THAT THERE ARE QUITE A NUMBER OF THINGS THAT WILL BEAR MENTION WITHOUT PROOF WOULD SEEM TO BE TRUE—THESE ARE SOME OF THEM

That the delightful throbbing of a well-timed motor creates a sensation of restful comfort in the being of the fortunate owner of the automobile; this condition may be perpetuated through the proper use of lubricating oil.

That there is romance in everything; cut out the romance and you murder enthusiasm; slay enthusiasm and your automobile will sell for junk.

That there is an affinity between a mechanic and a mechanical masterpiece; sever the magic connection and the machine will fall into disuse.

That the man who cannot get up an admiration for the automobile that he owns had better dispose of it before the varnish looses its lustre; strange to relate, the varnish can tell if its master has lost his heart to another form of beauty.

That the locomotive engineer who talks lovingly to and pets the iron-horse that so willingly bends to his touch, is the best engineer in the employ every time; the reason lies in the fact that the engineer does not abuse the machine that he longs to caress.

That pleasant dreams depart on black plumed wings with the dawn of the day that sees the automobilist unmindful of his charge.

That discordant sounds come bellowing from the midst of unlubricated automobiles.

That the man who wants something for nothing is in the guise of longing coiled about despair.

That work, while it is death to lily-white hands, is the birthplace of happiness.

That the poet's dream and the craftsman's work are the equivalent of each other; the one delivers brain-food and the other produces bodily comforts that give the poet breath and being.

That the plundered soul of the abused machine leaves a wreck behind when it departs.

That ravages of time are as naught to the unmindful petty ways of unthinking man.

That delights elude the embrace of the bungler.

That the mind should not have such balloon power as to lift the feet up from the ground.

That water can be separated out of the gasoline if a chamois skin is first soaked in gasoline and then used as a filter.

That the wiring must be kept free from lubricating oil, otherwise the insulation will deteroriate.

That the high-tension cables must be protected in every way; the voltage is not far from 10,000, and it is prone to jump to adjacent metals through the insulation of the wire.

That much of the ignition trouble that is experienced is due to the presence of oil and dirt.

That some of the balance of the ignition trouble is due to bad joints.

That batteries must be kept charged if the ignition current from them is to be up to the fullest requirement.

That dry cells have to be replaced at sufficiently frequent intervals to assure the presence of a reliable source of electrical energy to deliver the required spark.

That slime in the gasoline piping is frequently at the bottom of an insufficiency of gasoline.

That a drop of solder in the piping is sometimes the mischief maker.

That a wad of waste, left in by the workman, is occasionally the cause of a shortage of gasoline.

That automobilists are sometimes absent-minded or languid.

That a misplaced float in the carbureter is the cause of the loss of much gasoline in many an automobile.

That it is easier to put a carbureter out of adjustment than it is to readjust it.

That a slipping clutch is a power consumer and a nuisance in other respects besides.

That a "fierce" clutch will wreck an automobile.

That the way to keep a clutch from acting "fierce" is to lubricate it.

Pointer on Chain Drive

Oilers in Convenient Places Insure Lubrication in Wet Weather

THE efficiency of chain transmission depends upon the amount of lubrication that the chain receives and the immunity from becoming clogged with dust and mud, provided the pitch of the teeth of the sprockets is correct and the alignment good. The first question is: What causes a chain to stretch, as it is made of metal, unlike a belt that can contract and expand? The answer is, wear; and the best way to avoid this is to have chain covers fitted so that all dirt is excluded and the chain can dip into oil and so be continually lubricated. Some cars do not adapt themselves very easily to chain covers, and it is also an expensive matter to fit these so that they do not rattle. Lubrication remains, therefore, to be properly attended to. Apart from fortnightly taking off and soaking in kerosene and graphite grease, small oilers that can be turned on and off at the driver's wish and without trouble, as here illustrated, would be found beneficial if the following method were adhered to: Copious oiling is not necessary, as it will bespatter the car with oil and make the paint soon look shabby. It is needless to tell an autoist what the effect of oil is on his tires. Of course, if he really wishes to know let him pour some on the floor where the car stands, so that the tire touches it. No, it won't explode; but with the tentacles of the octopus it will grip that tire, squeezing all the elasticity out of it, rendering it lifeless and asking every stone it meets to end its misery, as it is about to fall asunder. Returning to our muttons: The leads from the oilers should allow the lubricant to drop over the front sprocket so that the oil enters the rollers on the side of the chains nearest to the car — that is where the rollers touch the bridge pieces. Two to three drops per minute is sufficient for dry weather and four to five for wet. In wet weather the oil will prevent the chain receiving a coating of mud and so prevent wear. In Winter the oil should be very thin; otherwise it may freeze and clog in the pipes.

Drip feed lubricators below front seats for oiling chains

Questions That Arise

SOME OF THOSE THAT COME UP IN EVERY-DAY AUTOMOBILING ARE ANSWERED BY THE MATTER WHICH IS BEING PREPARED BY FOREST R. JONES IN THE NEW EDITION OF THE "AUTOMOBILE CATECHISM" THAT WILL SOON GO TO PRESS

[307]—Give the events that occur in a four-cycle gasoline engine in the order of their occurrence.

Any part of the cycle may be taken as the starting point. It is convenient to begin with the stroke that draws in the combustible mixture.

First stroke: Intake or admission stroke. The piston starts from its extreme position next the combustion chamber (from the highest position in a vertical cylinder engine) and the inlet valve is opened either by suction (automatic valve) or by the inlet cam (mechanical valve) at about the same time so as to allow the combustible mixture (charge) to be drawn in by suction until the end or about the end of the stroke. The inlet valve closes at (or about) the end of the intake stroke.

Second stroke: Compression stroke. Both valves are closed. The piston moving toward the closed end of the cylinder (combustion chamber) compresses the charge to a pressure of about 65 pounds per square inch, as shown by gauge reading if a gauge is attached to the combustion chamber for obtaining the pressure.

Third stroke: Impulse, working, expansion or driving stroke. Includes ignition, inflammation, combustion and expansion of charge. The electric spark or other ignition device ignites the charge about the time the piston has completed compression, and combustion (following inflammation) takes place more or less rapidly. The gas pressure is increased by the heat of combustion (to about 350 pounds per square inch or less) and drives the piston out from the closed end of the cylinder. The expansion and cooling of the products of combustion lower the pressure as the piston moves out. Shortly before the end of the impulse stroke the exhaust valve is opened by the exhaust cam (the exhaust valve is always opened by a cam or other device positive in its action) and the gases escape rapidly with a characteristic puff until the pressure falls to about that of the atmosphere (to nearly zero by gauge).

Fourth stroke: Exhaust stroke. The piston, moving toward the closed end of the cylinder, expels more of the remaining gases through the open exhaust port. The exhaust valve is held off its seat until (or after) the end of the stroke. This completes the cycle. It is begun again with the next stroke, and continues on indefinitely.

[308]—What speed of rotation must the camshaft have?

Half as fast as the main shaft of the engine if each cam has only one lobe (lug, protuberance) or depression. The camshaft must be positively driven, as by tooth gears, by the main shaft. The gear on the camshaft has twice as many teeth as the one on the crankshaft. This applies to the four-stroke cycle motor. In a two-stroke cycle motor the camshaft rotates at the same speed as the crankshaft when the cam has only one lug, provided there is a camshaft, which is not usually so for a two-cycle motor.

[309]—What are two-to-one gears?

The gears used to drive the camshaft of a four-cycle motor. The driving gear is on the crankshaft. The driven gear on the camshaft has twice as many teeth as the driving gear.

[310]—What is a muffler and why used?

It is an enlargement (or enlargements) of the exhaust pipe, or a corresponding device to deaden the noise of the exhaust.

[311]—Does the muffler reduce the effective power of the engine?

Yes, but only to a slight extent when properly designed and installed. A cut-out valve is often applied to allow the exhaust to escape without passing through the muffler.

[312]—Why are piston rings used?

In order to make an air-tight fit of the piston and rings combined in the bore of the cylinder. It is found impossible to make the solid piston fit tightly enough in engine practice. The rings, on account of their thinness and being cut open on one side, expand by their elasticity against the bore of the cylinder so as to make a tight-fitting joint and adjust themselves to variation in diameter of bore caused by heat and wear.

[313]—What is a "dead center"?

In reference to an engine it means the position of the crankshaft which brings the connecting rod and crank in line so that a force exerted upon the piston to move it along the bore of the cylinder has no rotative effect on the crank, and the engine remains dead. In the ordinary types of engine each crank has two dead centers, one-half revolution of the crank apart, one for each position of the piston at the end of a stroke. The dead centers are not one-half revolution apart in an engine whose cylinder is offset so as to be somewhat to one side of the crankshaft.

Peculiarities of Dry Batteries

Telling Why an Open Circuit Test Gives Little Real Information

DRY batteries are much in vogue as the auxiliary source of electrical energy when a magneto is relied upon under working conditions for ignition purposes. The improvements that have been made in dry cells in view of the promise of a large return since the coming of the automobile were very marked indeed. It is within the memory of the average automoblist when dry cells were absolutely limited to unimportant open circuit work, as for bell-ringing in private dwelling houses, and even then confined to the minor responsibilities.

The unknown quantity in a dry battery is the internal resistance. Let the voltage be what it may on open circuit, the fact remains that if the cell is poorly made, or "dried out," instantly the circuit is closed, and the current begins to flow, the voltage will drop responding to the conditions of Ohms' Law, which may be stated as follows:

"The electro-motive force in volts is equal to current in amperes divided by the resistance in ohms."

The understanding of this law will compel the conclusion that measuring the voltage of the cell affords no information other than that given by the measurement. It stands to reason that if the resistance (internal) is high, instantly the circuit is closed, the voltage will drop, and the energy available from the cell under such conditions will be reduced accordingly. The energy output of a battery may be known as follows:

"The instantaneous value of the energy in watts is equal to the electro-motive force (unclosed circuit) multiplied by the current in amperes."

An examination of this statement will suffice to indicate that if the internal resistance of the cell is high, since it is the constant in the formula, the voltage will drop as the current increases and the output in watts will be low and in a poor battery too low to properly serve the intended purpose. From what has been said, it remains to reach the conclusion that in testing dry cells to obtain stable information it is necessary to use an ampere meter to show the current flowing, and a volt meter (simultaneously) in order to observe the voltage.

Keep Out of the Poorhouse

Watch the Carbureter and Make Sure That It Is Properly Adjusted.

JUST making an automobile go is the least thing to do. Economy tests almost invariably show better results, by far, than are realized by automobilists in everyday work. Why is this? Why not? When a company enters one of its models in an economy run, one of its skilled artisans takes at least a few moments adjusting the carbureter and oiling up the various bearings. What is this for? Were the bearings to run so freely that there would be no friction at all, the automobile, once started, would run on forever unless it were to come to a hill. Of course, the road bearing is counted in the list that must perform without friction. Having eliminated all the friction that oil is capable of, it remains to put the motor in good order so that it will deliver the desired amount of power with the minimum use of gasoline.

Now, there is no good reason why any automobilist may not obtain exactly the same economy which the maker is credited with in a run. It is the same automobile; every function may be taken advantage of to the same extent, but it will surely be necessary for the automobilist to realize that it is the carbon, hydrogen and methane that are of value; to throw these fuel components away is like throwing the motor out of the car.

The way to coax economy into the motor is to keep at the carbureter; trying to reduce the size of the hole through which the gasoline runs out without shutting down the motor or reducing the power below the reasonable demand.

The gasoline taken into the combustion chamber from the tank through the carbureter will be spent to no avail unless a sufficient amount of air is also drawn in.

The air holds 82.7 per cent. of nitrogen by volume, and with it must come 22.0 volumes of oxygen. The nitrogen is valuable because it is inert; detonation being thus avoided. But the oxygen is what is wanted in order to burn the gasoline. When the gasoline is properly mixed with the air it is ready to be burned, forming carbonic acid and water. If there is not enough air present the mixture will not burn as stated, but a certain quantity of carbon monoxide, hydrogen, carbon and menthane will escape to the atmosphere.

Now, the value of the hydrogen, methane, etc., is so great that if a very small percentage of them escape the loss in fuel value, in other words, in distance that can be covered per gallon of gasoline, will be great. It has been estimated that over one-third of the gasoline is lost in the average motor, due to the fact that there is too much gasoline feeding to the motor. Cut down the gasoline as much as possible and feel around with the air valve lever to find the rate of air that will make a smaller quantity of gasoline do more work.

Hardening Permanent Magnets

Hardening All Over Is the Latest Practice

PERMEABILITY, while it is maximum in annealed iron, and desirable in magnets, is not the only requirement in permanent magnets, and it has been found in practice that the retentivity is better in the permanent form of magnet when it is hardened all over. In the Lindenberg Steel Mill, at Remscheid-Hasten, using the electric furnace steel, experiments with hardening resulted in the conclusion as follows: The permanence is the same when the magnets are either hardened at the ends or when they are hardened all over. It is stated by them that the average value of the magnetic flux in the long run it better when the magnets are hardened all over. In hardening plain water, acidulated water and brine were experimented with, and the best results were obtained when brine was used as the hardening solution.

Practical Repairing

DEFINING THE PROCESS OF REPAIRING CYLINDERS THAT HAVE BEEN CRACKED BY FROST OR OTHER CAUSES, USING THE LATEST AND MOST EFFECTIVE METHODS, WITH ILLUSTRATIONS OF WORK

PARTS of a car that have for some reason or other broken or been cracked, such as cylinders and the like, can with care be reinstated to their original condition by what is known as autogenous welding. This process consists, in a few words, of melting the adjoining pieces and running into them metal similar to that from which they are made. The source of heat is either a mixture of hydrogen and oxygen, known as the hydro-oxygen process, or acetylene gas mixed in correct proportions with oxygen, known as the acetylene process. The equipment illustrated in Fig. 3 is of the latter type and consists of the cylinder C1 containing, when full, oxygen compressed to 150 pounds per square inch, to which are attached two gauges G1, the amount of pressure being used and controlled by the valve V2. G2 is a gauge showing the total amount of pressure in the tank, with a stop-cock S1 to entirely turn off the pressure.

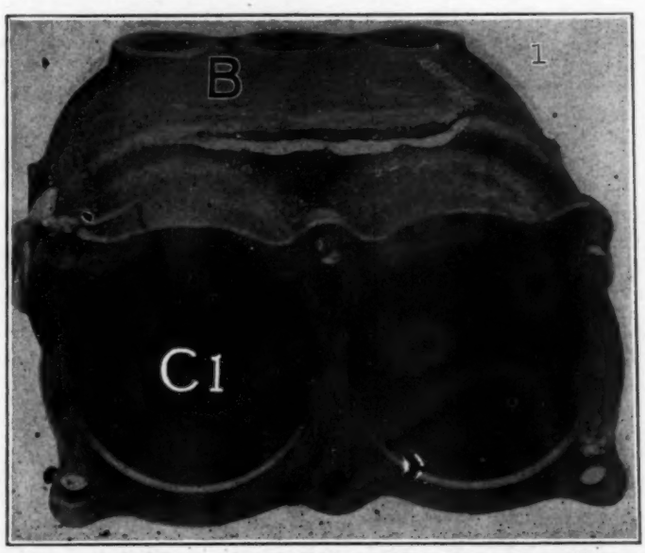


Fig. 1—Cylinders, cracked by frost, showing V-gap for welding

Cylinder A2 contains compressed acetylene gas, the flow of which is operated by the main tap T1 and the valve V1. The handling of acetylene is attended with risk if great care is not exercised, as should the flow exceed 20 pounds pressure per square inch the makers of the cylinders state that the gas becomes self-explosive. The interior of the cylinders is filled with asbestos discs which are steeped in acetone, which is capable of assimilating 25 times its own volume of acetylene, and in this manner the gas becomes transformed into a liquid. The air and gas pass from their respective cylinders through special rubber piping P1 and P2 to the burner B1. Rubber tubing is preferable to metal piping, for should the pressure become too strong the rubber will give and there the damage is ended; otherwise the burner might explode with disastrous result to the operator.

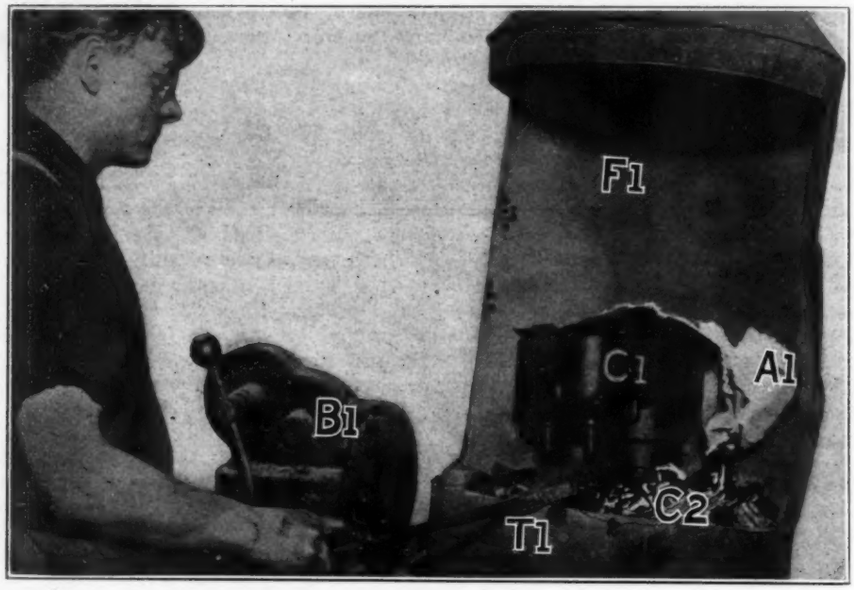


Fig. 2—Cylinders placed in blast forge and covered with asbestos, to be heated before welding

The illustration does not represent the relative size of flame used in welding by this process; the actual size is about one-half inch to one inch in length measured from the end of the nozzle of the burner. Different size burners are used, the size of the orifice depending upon the work to be carried out and whether the broken parts are large or small; they resemble the spray nozzle of a carbureter, being made of brass, and are known by the number size of the orifice. The light from the flame is so intense that it is necessary to wear blue glasses.

The burner B1 is held by the operator as shown in Fig. 1, and has two taps with which to regulate the flame. Parts that several years ago would have been thrown on the scrap heap can now by this process be repaired for a comparatively small sum, and made to answer the same purpose as new parts, with a great saving in the cost. Simple as the process may seem, the operator must thoroughly understand his work, as the metal can be overheated and cause a crack in another place. The heat of the flame from acetylene and oxygen can be raised as high as 6,500 degrees Fahrenheit, and when as an illustration of its power of dissolving metal, a steel railway rail was taken and cut through in a few minutes that in the ordinary way takes two men with a saw several hours to accomplish, some idea of its intensity can be realized.

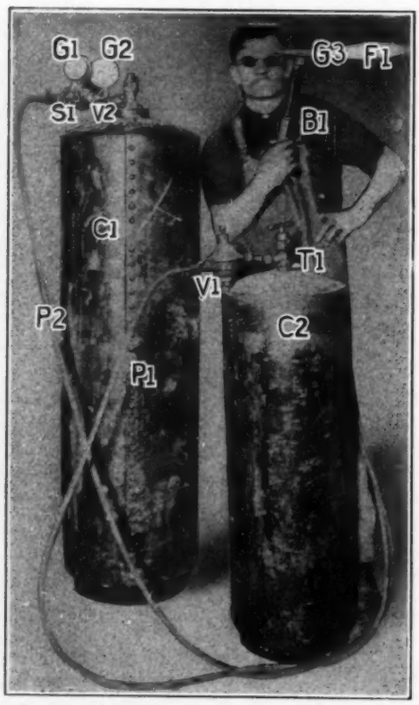


Fig. 3—Welding equipment, showing oxygen and acetylene tanks, gauges, valves, etc.

The pressures at which the gases leave their respective cylinders are 25 pounds per square inch for the oxygen and between 6 and 8 pounds for the acetylene, and as the valve V1 has only a very small opening the amount of flow can be regulated to a nicety.

Figs. 1 shows cylinders that have been damaged by over-cooling; in other words, by the freezing of the water in the jackets. It can be seen that the metal around the crack B1 has been cut away with a chisel in order to better get at the work and for a channel for the additional metal to flow into.

Fig. 4 represents the lug P1 of a cylinder C1 that has been broken off the base F1. The cause of this breakage is common where the thickness of the metal at the base is insufficient to withstand the force exerted inside the cylinders by the explosions, although if the cylinders are improperly bolted down or the nuts slacken off the result will be as here depicted.

It is proposed to deal with the method of welding the lug into place, and the same process applies to other work on cylinders. The first operation is to bolt the part in place as if it were on the base chamber; a piece of steel is drilled for the holes for bolts to pass through and with one of these the broken part is attached as shown in Fig. 6, the plate B2 extending the whole length of the base and secured by the bolts B1, B2. The part is then taken off and filed into a V-shaped gap to allow the metal to run in easily.

The cylinders C1 are now placed in a charcoal fire C2 as shown in Fig. 2, air blast being delivered by the blower B1. The top is provided with a cowl F1 to carry off the fumes, and strips of asbestos mill board are placed around the job to keep the heat in and give a uniform increase in heat. The object of this is to expand the metal uniformly, for when the extreme heat from the acetylene is applied at any particular spot, and the metal expands only at that spot, the other metal, if cold, is liable to crack or distort.

The heating has to be carried out slowly or the effects will be the same as if no heat were applied at all.

The burner is then taken in hand and, with the acetylene alone turned on, is lighted. The oxygen is now turned on in sufficient quantity to give a flame the required size and heat for the particular work and metal to be treated, and in the case of the cast gray iron from which cylinders are made the point of melting is about 2,220 degrees Fahr.

The flame is directed into the groove first, melting

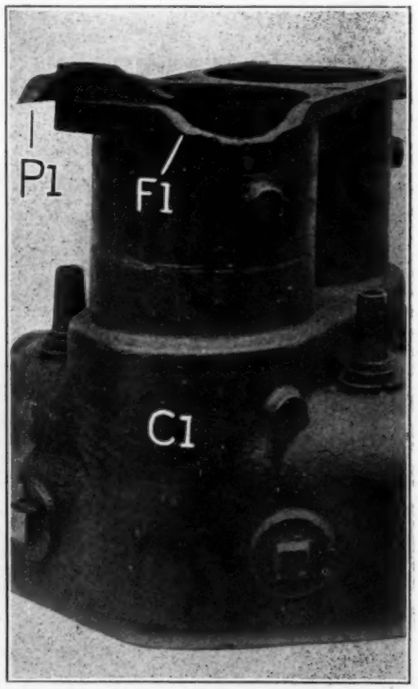


Fig. 4—Showing cylinder with bottom holding down lug broken off before repair

the thin bottoms, and at the same time a strip of metal in rod form 1-4 inch thick is held in the flame. This soon melts and runs into the parts to be joined, uniting them in such a way that when the superfluous metal has afterward been cleaned off it is impossible even to detect the joint. The process, therefore, consists in building up the gap by filling in new metal.

A white alkaline powder is used with cast iron only, other metal being treated with the flame alone. The powder is used to dissolve the globules of oxide that form in the heating process and acts as a flux in that it brings all impurities to the surface; it is known as a scaling or cleansing powder.

Fig. 5 shows the method of filling the crack inside the cylinder after the outside has been finished, as shown in Fig. 7. The operator is holding the metal rod M1 with the tongs T1 in his left hand and with the right directing the flame F1 onto the crack F2, the plate bolting the lug L1 in place having previously been removed.

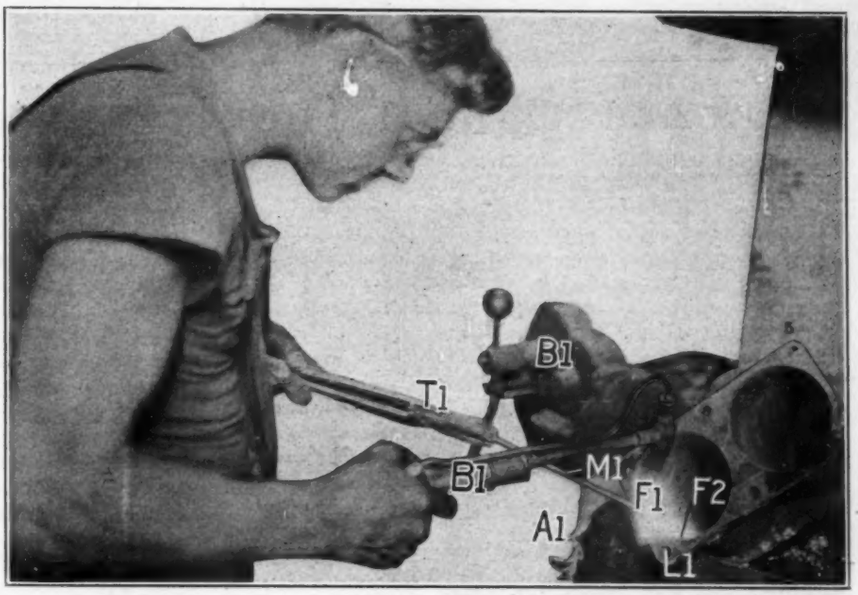


Fig. 5—Showing operator working at inside of cylinder to repair a crack

During the operation of running the metal it is necessary to move the cylinders around so that the part on which the flame plays is vertical and the metal will run down into it. Particles of metal may run inside the cylinder, but there is no difficulty in dislodging them, as the moment the flame is withdrawn the fusion stops.

The final operation consists in cleaning up the outside and turning off and polishing the inside walls at the parts treated.

Magnesium as an Alloy—Magnesium has a specific gravity of 1.7, so that it is much lighter even than aluminum, whose specific gravity is 2.6, while that of iron is 7.8, so that magnesium is more than five times as light as iron and 50 per cent. lighter than aluminum. A recent French patent describes a process of manufacturing alloys of magnesium and zinc, containing as much as from 90 to 96 per cent. magnesium. The same inventor claims to have succeeded in making a practicable alloy of calcium, whose specific gravity is 1.58, with zinc, copper or aluminum, or a mixture of these three metals. It is proposed to produce a magnesium alloy suitable for aeroplanes, combining lightness with strength. Visitors to the Olympia Aviation Show of 1909 may recall an alloy answering in some respects to these characteristics. It was about 40 per cent. lighter than aluminum, *e.g.*, a triple stayed eight-gallon fuel tank of the bolster pattern weighed 4 3-4 lbs.—*The Trader.*

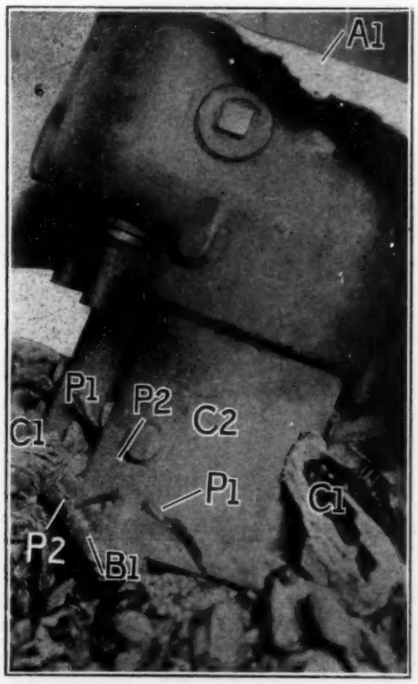


Fig. 6—Showing lug bolted to cylinders and V-shape groove cut; the charcoal fire around can be seen.

There Are Others

Chauffeurs Not the Only Delinquents As Regards Underinflation

SAYS THE AUTOMOBILE staff man: "During the past two weeks I have put the gauge on at least 60 tires, and there has been but one that showed a pressure approaching correctness, viz., a 36 x 4 1-2 showing 90 pounds. A few days ago I saw a large six-cylinder car with 37 x 5 1-2 tires that had just been put on by the tire makers and which the men tried to inflate till they were fatigued. They said the tires had 115 pounds pressure in them, but as a matter of fact when I put the gauge on them one showed 75 pounds and the other 45 pounds. If a man is supplied with some mechanical device with which to pump the tires there is no excuse for underinflation. At a garage where pressure is supplied free from a central compressor I pumped a tire so that it would stand no more, or, rather, the compressor would not give any more than was in the tank, which was 75 pounds. One would have thought that the tires would also have 75 pounds; but no, they registered only 45 pounds. The reason for this was that there was a leak in the connection in the piping from the tank to the main floor of the garage, which shows the necessity of testing with a gauge and not guessing."

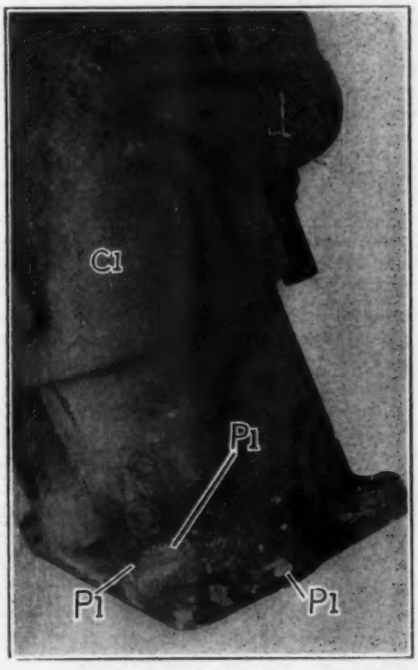


Fig. 7—Completed repair before filling up. After this has been done it is impossible to see the join.

Care and Repair of Tires

MANY TROUBLES AND A GREAT AMOUNT OF THE EXPENSE OF TIRES CAN BE TRACED TO THE CLINCHER RIM

THE average autoist when he buys his first car knows very little about such things as quick detachable and demountable rims except that he is aware that there are such things; and if they are not fitted to the car as a regular part of the equipment there may come some suggestion from the seller of the car that they should be fitted as an extra. This is just the point that a discerning buyer has to grapple with after the car proper has been decided on, viz.: How little can be spent on extras? The causes of tire trouble are twofold; abuse and the difficulty in putting tires on clincher rims without damaging the tires in the first place. Abuse of tires has been handled in these columns from different points of view, and the mere question of rims cannot alter matters if brakes are applied harshly or if the tires are run underinflated. It has been estimated by competent authorities that 18 per cent. of tube troubles can be laid at the door of the ordinary clincher rim; by this it is not meant that the rim proper is the culprit, but owing to the difficulty attending the putting of tires on this rim, and want of experience and practice of the owners of cars, the operation cannot be carried out without damaging the tire in some way or other. The greatest item in the upkeep of a car is the tire bill, and as makers do not build their cars to the tire but fit tires after the car is manufactured it is up to the autoist, so to speak, to insure himself against trouble. A fair mileage for the all-the-year-round driver would be, say, 25 miles per day for 300 days, which would show a mileage of 7,500 miles per annum. Supposing the life of the tires averages 2,000 miles per tire, 16 tires will be required for this mileage, and it would be safe to estimate two tubes per tire, not taking into consideration for the moment the cost of repairs to same from any cause whatsoever. What is the natural result? If an outlay of say $100 would show a return of 6 per cent. per annum in the ordinary course of events the investment would be considered a good one. This figure more than represents the cost of any device on the market to facilitate quickly detaching tires and assist the process of putting them on the wheel.

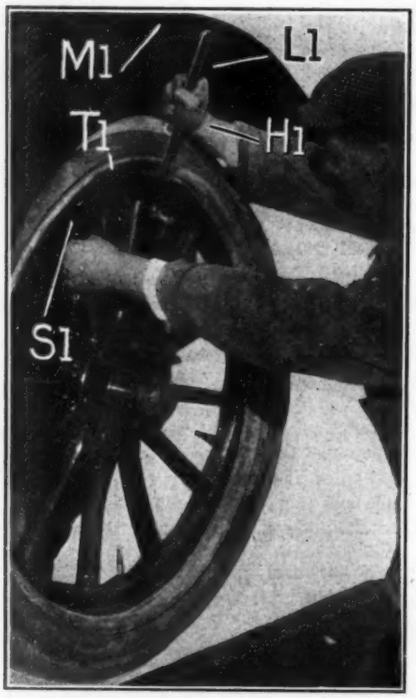


Fig. 1—Operator using short lever unable to get at tire owing to mudguard

The claims of the devices are various, but the gist is that tires can be put on and detached easily without the laboring and struggles attending the use of the clincher. It is no uncommon sight to see drivers using hammers or anything handy to knock, push or prod a refractory tire, and instead on saving the tire abuse in this manner their paramount idea is to get the tire on. If the work has to be accomplished on the road, the quicker it is done the better they like it.

Fig. 1 shows a man struggling with an ordinary clincher beaded tire with a short lever L1 barely a foot long. This amount of leverage is altogether inadequate to overcome the resistance of the tire. Further, the mud guard M1 gets in the way, preventing him from gripping the lever with his right hand in the position H1 so as to obtain all the leverage possible and at the same time giving the lever only a small amount of travel. The average amount of clearance allowed between the mud guard M1 and the tire T1 is five inches, but this is often decreased through structural causes, necessitating the operation being carried out as shown in Fig. 3. Here the man has the full travel of the lever, be it a straight lever L1, as in Fig. 1, or the forked lever L11, as in Fig. 3. The operator is here shown inserting a security bolt as it should be done, and the method depicted in Fig. 2 shows how it should not be done. In the latter case the bead B1 is distorted by the lever L1 and the point of the lever is straining on the canvas C1. The probability is that the canvas strands will be segregated at the point of contact of the lever and start the foundation of a blow-out. As long as the strands of canvas remain intact the strength of the fabric is sufficient in a well-made tire to withstand the strain imposed upon it, but the moment the strands are damaged in any way the chafing and rubbing and rolling of the tire will increase the size of the hole. There is a right and a wrong way of doing most things, and inserting inner tubes is no exception to the rule. One has only to catechise oneself and ask: "How many tubes that have been damaged on my car are the result of nipping?" Supposing the tubes to cost $5 apiece, the 18 per cent. amount of trouble due to nipping can be obviated by using some additional fixture, and on an outlay of $100 for tubes in the course of the year the saving, instead of the safe investment of 6 per cent., has risen to 18 per cent., without taking into consideration the additional life that would ensue if the outer casings were handled with more care and did not undergo the ill usage to which they are unavoidably subjected.

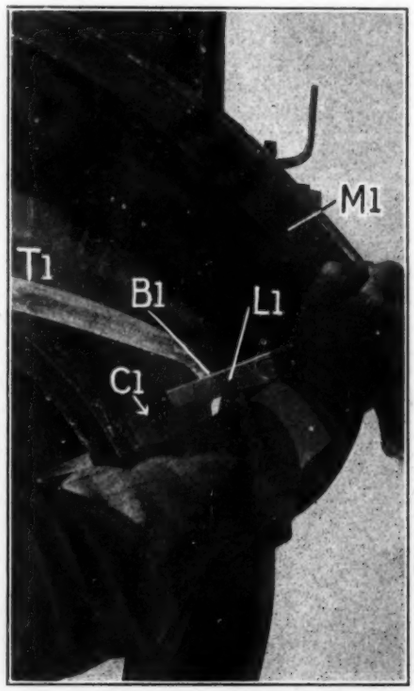


Fig. 2—Easiest way to cut the inside canvas, forming the nucleus of a blow-out

No one would think of going out without any oil in the engine, but how many times

are tires put on the car without a particle of soapstone or French chalk to prevent heat and friction! Tires require in a certain sense as much lubrication as any other part that is subjected to friction. Fig. 4 shows what occurred to a tire that had been run 500 miles without soapstone. It will be seen that the tube T1 has a gash G1 about a foot long; this was not caused by heat alone, but was due to the tube sticking to the outer cover and the security bolt, so that when the tire was removed to repair a pinhole puncture, instead of coming out easily, as it should have done when pulled, it simply tore in the manner shown. The imprint I1 shows where the security bolt stuck to the bead, and the tube adhered so strongly to the inside of the casing that it took two men to tear it apart, one man pulling the tube while the other pulled the cover in the opposite direction. Flake graphite sprinkled in between the tire and shoe will prevent them from sticking together and is quite as efficient as talc. There need be no fear that graphite will in any way be detrimental to the rubber, because graphite is absolutely inert, not having any acid or alkaline properties. Large quantities of flake graphite are used by rubber packing manufacturers in order to get the necessary lubrication. When flake graphite is sprinkled into the vulcanizing mold a clean neat job is practically assured.

Fig. 4 serves as a good means of showing how an outer casing should be opened to thoroughly examine same for small holes and cuts in the fabric and gives an opportunity of patching them with canvas supplied by the tiremakers and in tool kits for the purpose. The size of the patch should be at least one and a half inches larger than the hole or cut so that the adhesion will be sufficient to counteract the outward expansion of the tire. Care should be taken to clean off all traces of soapstone on the lining of the casing so that the canvas patch will have a good foundation, for if it is only superficially attached the first wet day will allow sufficient moisture to get in to detach it, and it is principally against this enemy of tires that the patches are put on.

If the care of tires can be rendered less a matter of hard labor the autoist would try to pay more attention to the matter, but the average man would sooner leave well enough alone. If a tire is running satisfactorily at the moment it would seem unnecessary to disturb it. But if the tube could be taken out from time to time easily without fear of damage it would be greatly benefited with a rub over to remove the caked powder and fresh soapstone inserted. A tire that looks a little weak might with advantage be taken off the rear wheel and be placed on one of the front wheels with advantage and so prolong its life.

Fig. 3—Correct method of inserting security bolts and valves with a forked lever

All this is possible with a good many of the devices on the market, but there is one point that must not be lost sight of when choosing such a fitting, and that is that besides possessing the virtue of quick detachability the rim must be fixed in such a manner that it is secure and has no wearing parts to lubricate or get out of order.

The Village Blacksmith

"A Friend in Need Is a Friend Indeed" Is Applicable in This Case

FROM time to time it becomes necessary to have the car overhauled so that one can be sure not to be "hung up" on the road on a dark rainy night, this being the worst time to work on a car, although it is bad enough to have trouble at any time, especially with the engine. The point about the dark rainy night that particularly strikes the autoist is that in this particular vagary of the atmospheric conditions it is hardest to work and keep one's temper.

A joint comes loose perhaps and it is necessary to get the car somehow to the nearest forge to heat the job for brazing. The average village blacksmith is a good fellow, with brawny arms, but automobiles are not his pet weakness owing to the amount of trade he has been deprived of through the death knell of the horse having been sounded, as some will have it; every one will admit he has lost some trade. But he can be of great use to stranded autoists, as most automobilists can testify.

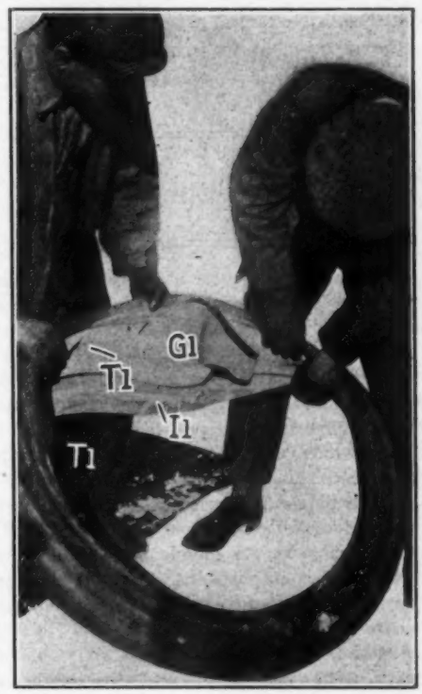
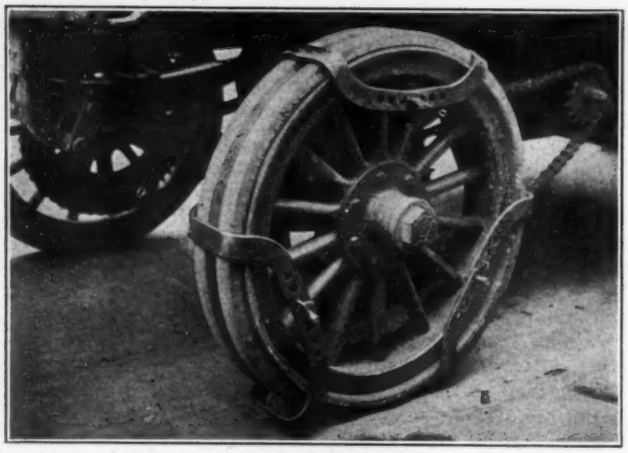


Fig. 4—Tube torn through sticking to the cover owing to want of soapstone

For example, the autoist is unfortunate enough to have a collision and bend his frame. The blacksmith can be of service in putting the frame back in such order that it is safe to drive; the first thing to do is to heat the frame to a good red heat, removing the body if necessary and inserting asbestos boards, or failing this, sheets of metal in order not to burn the paint on the springs; while hot with the use of bending irons the frame can be brought back to its original position. It is not often that the rear end of the car suffers in a collision, it usually being the front members of the frame that receive the blow. To effect repairs to the front of the car it is as well to remove the radiator and fit up some means of protecting the engine from heat that is applied to the frame. Heat applied at the point of bending and the use of a large wrench over which a tube has been fitted to increase the leverage should bring the form back with a little judicious hammering.

The ingredients a blacksmith does not always know are the fluxes for brazing and soldering, and these are as follows:

METAL	FLUXES
Cast iron, Malleable iron, Steel,	Borax, Sal ammoniac.
Copper, Brass, Gun-metal,	Sal ammoniac. Chloride of zinc. Rosin.
Tinned iron,	Chloride of zinc or rosin.
Zinc,	Chloride of zinc, commonly called "killed spirits."



Lyon non-skid for trucks consisting of metal bridges easily detached. Picked up by the "Staff Photographer" on the street in New York during the recent snow storm

Stops Thief and Joy Rider

Tricks of These Gentlemen Are Legion, but Axle Drawing Checkmates

SEVERAL suggestions have been given from time to time as to how the car can be left so that it cannot be used in the owner's absence, and among these are lock switches and lock taps for the gasoline; but to any one with the desire to do wrong, what are these trivialities? Of course they are good for street stoppages, but the garage fiend can easily overcome them. One method is to fit a strap over the hood with a lock. If any one wishes to take it off, the screws can be taken out; and if this is impossible, as the strap is sometimes riveted, a knife will soon overcome the leather bonds. Quite the latest method of effectively preventing the car being used while the owner is away for any length of time is to withdraw the axle shafts, if it is possible. The intention of the makers of cars so fitted was to facilitate the removal of such parts as the bevel gears without dismantling the whole axle, but the further use should not be forgotten. It stands to reason that if the magneto or a valve is removed, the car cannot be used; but less trouble is required in removing a shaft; besides, magnetos and valves are not uncommon things.

Dead Magnets Rejuvenated

When Permanent Magnets Weaken it Is Necessary to Remagnetize Them

ELECTROMAGNETS are made with a soft iron core and a coil of insulated wire is wound around them so that when the armature is rotated the current from the same passes through the wire of the magnets and they are saturated. By means of this magnetism the voltage of the armature "builds up" and the faster the armature is rotated the higher will be the voltage. But when the armature is stopped the current will fall to zero and then the soft magnets will be depleted of their magnetism excepting for a residual magnetic field that is always present, decreasing in value as the iron of the core is soft in variety and in the more perfectly annealed state.

Substituting high carbon steel for soft iron has a marked effect upon the behavior of the magnets. If the steel is hardened the magnetism will remain in once it is induced. The retentivity of the steel for magnetism will be great as the carbon content is increased, being a maximum at 90 points carbon, with the metal in the hardened state, as when it is heated at a high temperature and quenched in brine. If tungsten is added to the metal the carbon may then be reduced from 90 points to a lower level with a gain in the good working of the magnets. If the tungsten is 6.5 per cent. or nearly so, the carbon may then be held at about 60 points and for magneto work this metal will hold to a high state of magnetic saturation for a long time.

There are two reasons for desiring to reduce carbon and add tungsten. It is unfortunate, perhaps, that as carbon is increased the flux density decreases. This difficulty is overcome to some extent by reducing carbon and adding tungsten. It has also been found that the magnets will weaken faster if carbon is high, without tungsten, than with lower carbon and when tungsten is present.

Substituting high carbon tungsten steel for the soft iron core before mentioned would result in permanently magnetizing the cores, and thereafter the occasion for using a field winding is done away with. True, a soft core will build up a stronger field and if this is a necessity the soft core must be used; in lighting and power dynamos such is the necessity. For magnetos as used in ignition work permanent magnets provide a field that is amply strong and it is an advantage therefore to do away with the winding.

In the course of time the permanent magnets lose some of the magnetic flux and the voltage generated in the windings of the rotor is then reduced considering a given speed. Under such conditions it is either necessary to run the rotor at a higher speed, or have the permanent magnets remagnetized. It is not a large undertaking to do so. A very simple way is to purchase a length of No. 12 Brown & Sharp's gauge, double-cotton-insulated copper wire, sufficient to measure 0.3 ohm. Wind this wire into a coil with an opening in it so shaped as to permit the permanent magnets to enter it as shown in the illustration. When the wire is in place put the keeper in place and then connect the two terminals of the coil of wire to a 3-cell storage battery such as is used for ignition work. The flow of electrical current from the battery will be:

Let I = current in amperes; E = electromotive force in volts, and R = resistance of the coil of wire in ohms.

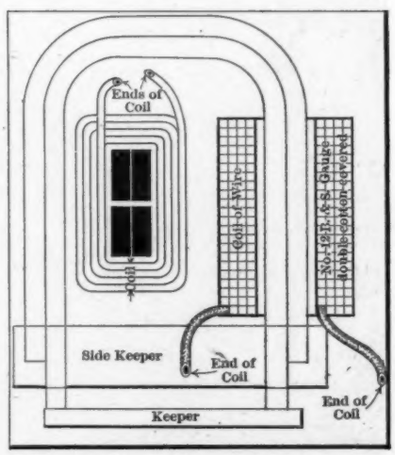
When,

$$I = \frac{E}{R} = \frac{6}{.3} = 20 \text{ amperes of current.}$$

This is on the assumption that the storage battery of three cells in series will deliver 20 amperes of current at 6 volts. The resistance is given as .3 ohm; it is measured cold, remembering that the current will not be passed through the coil long enough to raise the temperature so high as to interfere with the process.

Several applications of current are better than one, but the time required for each application will scarcely have to be more than a few moments. In parting the circuit when it is desired to interrupt the flow of current, it is right to pull the wire away slowly in order not to reverse the polarity of the permanent magnets. Drawing the arc is but a matter of parting the wires at a slow rate and this process has the same effect as putting a resistance in the circuit and increasing the same until the current recedes to zero.

The storage battery will not be damaged even if this work does require a discharge greater than the normal rating of the same.



Showing how the magnetizing coil is wound around the magnets to be rejuvenated

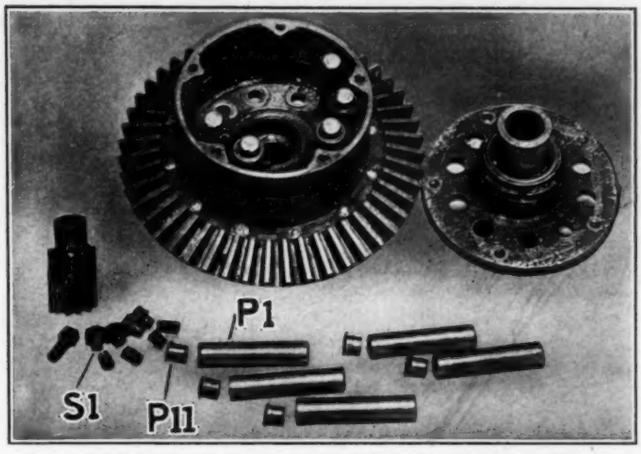


Fig. 1—Pins and bolts sheared in differential housing caused by going over a bad bump at high speed

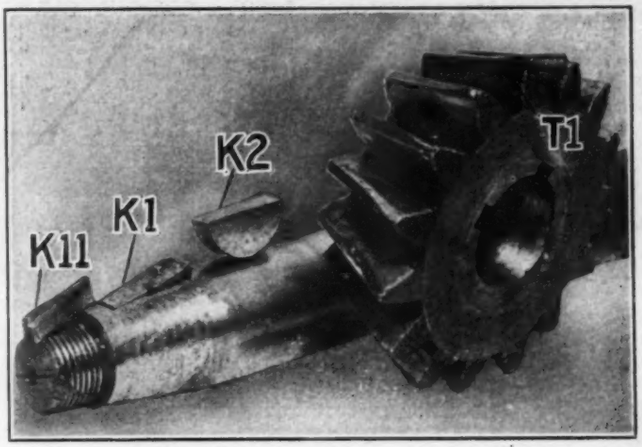


Fig. 2—Keys sheared and pinion deformed by the combination of bad road and high speed

Cause and Effect

Bumpy Boulevards Should Be Driven Over at Slow Speeds (Verb. Sap.)

THOSE familiar with the Hoffman Boulevard, Long Island, know it to be a bad road, and would never drive along it at a rate of over 20 miles per hour. But an automobile is a good-natured beast and stands for a lot of ill-usage, and the more it stands the more it is likely to be asked to stand. It cannot be wondered at, therefore, that sometimes it revolts; but the worst of it is that when it does kick in the traces it is not so quickly over with as when its equestrian rival shows its temper. The effect of striking a bad bump in the road at high speed can be seen by referring to the photographs of a differential recently put out of action on the above-mentioned Boulevard. Pause for one moment and think what happens to a car that leaves the road at speed, and what strain is thrown on every part of the car. Pinions are fixed on shafts either by keys, or the shafts are squared at the ends, or the shaft has a solid key milled out, and it depends upon the breaking strain of the metal as to when the shaft or key will give up work. The weakest part goes first, as is natural, and in this case the key K1, that holds the driving pinion T1 on the propeller shaft, succumbed. If only one key was fitted one can readily imagine that it would go; but there were two and they both sheared off as if they were made of lead. Laying on the shaft is a new key, K2, but before this can be fitted the shaft will have to be cleaned up, as it has been ploughed up by the particles of the old key after the shaft rotated inside the pinion. The broken part of the key K1 is shown near the key. This method of fixing cannot be recommended for this part of the car, a flat key of uniform thickness and having a bearing the entire length of the pinion being preferable. The differential proper has come off equally as bad, if not worse. Fig. 1 shows the differential housing with five pins in place; the pins that lay on the outside came apart in two pieces, P1 and P11. The part P11 fits in the housing and on this part all the stress is thrown. The screws S1 hold the outer cover of the casing to the main body and they sheared when the pins gave way as everything inside the housing was loose. The pinion took a decided twist in its teeth T1, as can be seen in Fig. 2, which all goes to show that it pays to drive slowly on bad roads. The damage is not always apparent at the time and may not show itself for a month or more; but when the last straw is imposed on the back of the long-suffering part it is bound to break and then people look around for the culprit. The usual answer to the problem is "faulty material."

Coming Events

CALENDAR OF FUTURE HAPPENINGS IN THE AUTOMOBILE WORLD THAT WILL HELP THE READER KEEP HIS DATES STRAIGHT—SHOWS, ANNUAL MEETINGS AND OTHER FIXTURES

Dec. 31-Jan. 7, '11.	New York City, Grand Central Palace, Eleventh Annual International Automobile Show.
Jan. 7-14.....	New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Manufacturers.
Jan. 11-12.....	New York, Annual Meeting, Society of Automobile Engineers.
Jan. 14-28.....	Philadelphia, Annual Show, Philadelphia Licensed Automobile Dealers' Association, First and Third Regiment Armories.
Jan. 16-21.....	New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A.L.A.M.
Jan. 16-21.....	Detroit, Mich., Tenth Annual Show, Detroit Automobile Dealers' Association, Wayne Pavilion.
Jan. 28-Feb. 4....	Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Feb. 6-11.....	Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.
Feb. 13-18.....	St. Louis, Mo., Fifth Annual Show, Coliseum.
Feb. 18-25.....	Minneapolis, Minn., Annual Show, Minneapolis Automobile Show Association, National Guard Armory.
Feb. 18-25.....	Brooklyn, N. Y., Annual Show, Brooklyn Motor Vehicle Dealers' Association, 23d Regt. Armory.
Feb. 18-25.....	Binghamton, N. Y., Second Annual Show, Binghamton Automobile Club and Chamber of Commerce, State Armory.
Feb. 18-25.....	Newark, N. J., Fourth Annual Show, New Jersey Automobile Exhibition Co.
Feb. 24-27.....	New Orleans, La., Annual Show, New Orleans Automobile Club.
Feb. 25-Mar. 4....	Toronto, Ont., Automobile Show, Ontario Motor League.
Feb. 27-Mar. 4....	Kansas City, Mo., Fifth Annual Show, Kansas City Automobile Dealers' Association, Convention Hall.
Mar. 4-11.....	Boston, Mechanics' Building, Ninth Annual Show, Licensed Automobile Dealers' Association.
Mar. 14-18.....	Syracuse, N. Y., Third Annual Show, Syracuse Automobile Dealers' Association, State Armory.
Mar. 14-18.....	Denver, Col., Annual Automobile Show, Management Motor Field, Colorado Auditorium.
Mar. 18-25.....	Pittsburg, Annual Show, Pittsburg Auto Show Association (Inc.), Exposition Hall.
Mar. 25-Apr. 1...	Buffalo, N. Y., Fourth Power Boat and Sportsmen's Show, Sixty-fifth Regiment Arsenal, Buffalo Launch Club.
Mar. 25-Apr. 8...	Pittsburg, Fifth Annual Show, Duquesne Garden, First Week, Pleasure Cars; Second Week, Commercial Trucks. Automobile Dealers' Association of Pittsburg, Inc.
Apr. 1-8.....	Montreal, Can., Automobile and Motor Boat Show, Automobile and Aero Club of Canada.

THE AUTOMOBILE

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FINIS will be the proper word to apply to the automobile business from the standardization point of view whenever it will be possible to visit an automobile show and come away impressed by the fact that all the automobiles are precisely alike in every essential detail, and when that more or less indefinable and vague thing "art" is in the throes of ecstasy. This sad state has never fallen to the lot of any art; ambition has ever been master of the situation, and if standardization means anything in this material world it has to do with the gradual advancing along progressive yet stable lines of the work that men do. In presenting the details of the automobiles that will be offered to the clientèle of the industry in the early part of 1911, it is not with the idea that they will represent the last word; it is even impossible to predict the time when the last word will be spoken—let us hope, never.

* * *

GRANTING that the wear and tear on the pneumatic tires of an autombile will depend upon the square of the velocity of the car on the road as a prime consideration, and upon the weight that the tires must support as a secondary but important factor, it remains to keep the speed as low as consistent service will admit of; but the weight question is not to be dismissed by a mere injunction. Under the head of "How to weigh a car" a diagram is given showing an automobile in three positions on a platform scale, and the story has to do with the taking into account of the relative weight of the front, and the rear end of the car. It is not believed that the average automobilist seriously considers what it means to overload a car, especially if the particular tonneau is an especially made creation which he, for reasons of style, inflicts upon an innocent chassis. If the original idea of the designer had to do with a light body, and the rear wheels were designed accordingly, even a couple of extra passengers in the tonneau would have a marked bearing upon the tire life. But if the owner of the automobile decides to dispense with the light body, and substitute a château instead, the poor tires will have to labor under a bridge-breaking weight. Nor is this the end. The owner of the automobile, if he goes in for a castle on wheels, will feel obliged to invite his friends to ride in the new creation and he will be much gratified by the effusive way they will have of telling him how delightful it is; but the chauffeur will experience a revelation by way of language when the owner subsequently goes down in his pocket to pay for the tire bill.

* * *

CONSERVATION is the theme which has awakened interest in many quarters, but the best understanding of the term may be applied to the average automobile. Conserving the automobile is a paramount issue. If owners of cars would only understand that they might prolong the service per dollar expended in the ratio of 3 to 1 by the simple application of lubricating oil, the market on this slippery substance would go up. The reason why the average owner does not understand this situation may be traced to the simplicity of the remedy and the ease with which the work may be done by anyone. As a simile it will suffice to state that the main reason for the abnormal sale of patent medicine may be traced to the fact that the patient does not know what it contains. Were someone to tell him that copious applications internally of water out of a well coupled with a goodly sprinkling externally of water out of the ocean would cure, he would go to the nearest drug-store and invest in another bottle of patent medicine. It is the same story coupled with the automobile. Lubricating oil, and its cousin of greater consistency, grease, are shunned because of their undoubted efficacy and the perfectly simple process involved in their use. But for those who prefer a real remedy and desire earnestly to prolong life and abort noise, a plan is presented this week in THE AUTOMOBILE whereby the automobilist may spread out the process of efficient lubrication over a whole year, dates being given with proper intervals between so that some of the bearings may be cleaned and lubricated on each occasion, leaving the rest of them for other fixed dates, without risking the ills of neglect, since all are duly provided for under a plan which includes specific dates.

* * *

PRACTICAL repairing is a subject which is being handled in THE AUTOMOBILE in such a way as to illustrate the real work that is being carried on in the various repair shops, and cylinder repairing by means of the oxy-acetylene flame is the subject for this week, practical efforts being illustrated.

News Section

HAPPENINGS OF THE WEEK IN VARIOUS SECTIONS OF THE COUNTRY AS GATHERED BY THE 84 SPECIAL WRITERS AND CORRESPONDENTS OF "THE AUTOMOBILE"

Vice-President Brown, of the Willys-Overland Company, Says High Prices are Due to Bad Roads—A. L. A. M. Officials and News of the Garden Show—Completing Preparations for the Palace Exhibition—Making Ready for Displays at Brooklyn, Philadelphia, Cleveland, Cincinnati, Newark, St. Louis, Baltimore, Syracuse, Milwaukee and Hartford—New York to Have a Permanent Show—Advance News of the Paris Salon—Distant Lands as Seen Through Auto Goggles—First Race of the Year to Be On the Pacific Coast—News of Maker and Dealer in Many Fields—Short News from Every Section of the Country.

Brown Lays High Prices to Bad Roads

INDIANAPOLIS, Dec. 12—That efficiency in road construction advances with the development of civilization; that better roads would stop the migration of farmer boys to the cities, and that the high cost of living is attributable in a large measure to existing bad roads are beliefs of Will H. Brown, vice-president of the Willys-Overland Company, who was a prominent figure in the American Good Roads Congress, held December 6 to 9, under the auspices of the American Road Builders' Association.

Mr. Brown says the people of Indiana have lost enough in "invisible taxes" during the last ten years to have paved every mile of the 21,864 miles of gravel roads in Indiana. To support this statement Mr. Brown gives figures which he has compiled to show that bad roads increase the cost of farm products on the market.

Government estimates on the actual cost of transportation over Indiana roads indicate that for each ton hauled one mile the cost averages 25.5 cents; that is, the cost varies in different parts of the State from 16 cents to 35 cents a ton-mile. Tests over a bituminized road between Philadelphia and Atlantic City demonstrated that freight can be transported over country roads for less than 1 cent a mile.

It is estimated that over roads in Pennsylvania, New York and New Jersey freight can be hauled for less than 5 cents a mile, so that the cost of transportation over Indiana roads is unusually high.

Garage Men After Dead Beats

The Garage Owners' Association of New York is now on the trail of the motor dead beat or "Fly-by-Night," as that class of car owners is sometimes called. The association is endeavoring to have a law enacted making it a misdemeanor for a car owner to surreptitiously remove his automobile from a garage without paying the charges due thereon.

The lien given to the garage keeper by statute merely permits the garage owner to retain the car in his possession until the accrued charges have been paid. The lien is lost when the car leaves the garage and so is ineffective to check the practice of the "Dead Beat."

To Abolish Thompson Avenue Grade

Included in the budget of New York for next year will be an item covering the expenses of eliminating the grade crossing of the main line of the Long Island Railroad at Thompson avenue, if the borough presidents accept the urgent advice now being given them by the city streets committee of the Automobile Club of America.

The crossing in question is one of the most serious obstacles to traffic in the metropolis. It lies on the main route to Long Island and during such affairs as the Vanderbilt Cup race and the recent aviation meeting at Belmont Park it proved itself to be a nuisance of the first class.

Seldom could it be passed without delay at any hour, and during the press of traffic in morning and evening delays often of as much as half an hour occurred.

Black Crow Car to Be Sold by Makers

Announcement has been made to the trade by the Crow Motor Car Company of Elkhart, Ind., that it has dissolved relations with the Black Manufacturing Company of Chicago, which has handled the selling end of the Black Crow car.

The announcement is dated December 6, but it is only just being received through the East. The Crow Company has secured considerable additional capital and in future will handle the selling of the car direct.

Otto F. Rost, who has represented the Black Company in New York, will remain with the Crow Company as manager for the East, New England and export business.

It is announced by the Crow Company, that the additional capital secured is sufficient to purchase the building in which the car has been built and to finance the new selling plan. C. C. Darnell as general sales manager and a number of other representatives have been taken over by the Crow Company.

Pioneers at A. L. A. M. Banquet

When the Association of Licensed Automobile Manufacturers assembles for its annual banquet, which will be held January 12 at the Hotel Astor, during the first week of the Madison Square Garden Show, it is expected that the function will set a new mark in the progress of the association.

One of the features of the affair will be speeches by several of the pioneers of the industry. The set program of toasts will be limited to three or four speakers of national repute.

McMurtry Resigns as Technician

Alden L. McMurtry, one of the leading technicians of New York with regard to automobiles, has resigned as chairman of the Technical Committee of the Automobile Club of America. Mr. McMurtry is a member of the Technical Committee of the Contest Board of the A. A. A.

A. C. A. Gives Smoker

The Automobile Club of America gave a well-attended smoker at the clubhouse Tuesday evening. Vaudeville, entertainment and refreshments were enjoyed by those present.

A·L·A·M· OFFICIALS

CULMINATING next month in a show that promises greater things than any so far staged on the American Continent, the history of the A. L. A. M. to this date has been a brilliant one. The life of the organization has been varied. It has not always floated along on the full tide of prosperity; it has had its ups and downs like everything else that bears the stamp of mortality.

From a small beginning it has grown into a vast, machinelike body, working—constantly working—for progress along lines of conservatism.

The history of the organization, like everything else connected with the rise of the automobile, is brief, measured in terms of years, but its work is colossal.

The association was formed in 1903 and its first roster included the comparatively few names of American motor car makers who were privileged to operate under the terms of the Selden patents which are now in a final stage of litigation in the United States courts.

Fred Smith of the Oldsmobile Company was chosen first president of the new-formed body, with George H. Day as general manager. Most of President Smith's term of office was spent in organizing and preparing for future activity and, at the end of the year for which he had been selected as standard bearer, he retired to give place to Col. Charles Clifton. Seven times in succession Col. Clifton has been invested with this leadership and he has seen not only the association grow out of its swaddling clothes, but he has also witnessed the automobile industry wax strong and lusty until to-day it stands out as the most remarkable development of this age, or, for that matter, of any other age.

While Col. Clifton has remained as president of the association, the executive officer—the general manager—has changed several times. In 1907 E. H. Cutler was chosen to fill that important post. Mr. Day, the original general manager, died about that time. Mr. Cutler served a year and was succeeded by M. J. Budlong, now president of the Licensed Dealers' Association of New York City. E. P. Chalfant was elected in 1909 and retained the office until the election of the incumbent, Alfred Reeves, who was recently re-elected.

One of the big things that has been accomplished by the A. L. A. M. was the work of its mechanical branch. When the association was formed the art of automobile construction was in its infancy. Everybody had widely differing views of many of the points of construction that are now considered well settled. In order to solve the maze of engineering problems that confronted the trade in those early days, the constituent companies delegated some of their best engineering talent to form a practical, professional body to straighten out the cumbersome puzzles. For several years the mechanical branch of the A. L. A. M. labored to eliminate some of the guess work from automobile building and the result of that work is acknowledged to-day wherever motor cars are made. The manufacturer who commences work to-day has the advantage of the titantic efforts and the gold and blood that was spent in perfecting the art to its present stage, by the mechanical branch. Coker F. Clarkson, who served long as assistant general manager of the organization, was working head of the mechanical branch, and due credit is given Mr. Clarkson by motordom for his earnest efforts along that line.

When the pioneers had demonstrated the necessity and advisability of holding annual shows, the idea was accepted by the A. L. A. M. without debate and, when the time was ripe, the association executed one of those simple, yet revolutionary coups that have marked the progress of motordom like milestones. The organization which had conducted a series of shows at Madison Square Garden since 1900 allowed its option on the exclusive right to exhibit automobiles in that building to lapse and the A. L. A. M. jumped at the chance like a hungry trout at a brown hackle fly in June.

Before anybody was the wiser, the exclusive right to show in the Garden had been tied up in a contract covering several years and the A. L. A. M. held the contract.

From the first show, held in 1906, the annual exhibition has been the event of the year, at least in Eastern automobile circles. Each successive show was larger, more scientific and more important than any of those that had gone before, and now, on the eve of the great show of 1911, the promise is for a display of vastly more brilliance and general interest than any of the others.

The accompanying picture gives some idea of how the great hall will appear when the time comes to swing wide the doors on January 7. An automobile is a bulky bit of mechanism at the best and would seem out of place in a drawing room, but artistic conditions and proportions have been studied out with so much care that the giant road locomotives seem to fit into

the scene like a bunch of blush roses in the corsage of a bride. They are not jammed in any old way and while there will be literally hundreds of them in the Garden, their presence will not be unduly obtrusive.

For all practical purposes the vogue of the automobile began in 1903 when 2,037 cars were made in the United States. Of these about half were manufactured by the members of the association. The following year saw a great spurt in the industry, the production running up to nearly 9,000, including both licensed and unlicensed cars. The following year, 1905, saw the licensed cars swell to a volume of over 20,000. From that point to 1908 the increase was steady in spite of the most uncertain financial conditions. In fact, the upheaval of 1907 must have proved a financial rout and an industrial disaster but for the steady prosperity of the great and growing manufacture of automobiles.

The panic had its effect upon the industry to a certain degree, for the figures of production show that, with the first gleam of returning confidence, the motor industry blossomed out like a sunflower and the production of the A. L. A. M. reached the magnificent total of 95,000 cars. Last year was another season of gigantic production and the astonishing total of 163,000 was recorded for the various members of the association.

The variation in average selling prices obtained by dealers during the past eight years tells an interesting story. In 1903 the average price was $1,133. It increased steadily each year with the augmentation of size and luxury and also experimentation until it reached $2,137 for each machine. That was in 1907. Prices did not break abruptly as might have been expected, but each year since the panic the average selling price of automobiles in the United States has declined until last year it touched $1,545, about the same level as obtained two years prior to the top of the wave. The reason for this apparent decline lies in the fact that large numbers of moderate priced cars have been marketed. At the same time the highest grade cars also increased largely in volume and to some extent in price.

The scope of the motor industry in the United States to-day may be estimated from a few subjoined statistics. There are 11,165 companies engaged in making automobiles of all sorts and accessories and parts for them. There are 137 distinct companies manufacturing gasoline pleasure cars. When the truck makers and electric and steam automobiles are added to this total, the aggregate foots up to 205. Michigan leads in this respect with Ohio second, New York third and Indiana fourth. But in the grand aggregate of motordom, New York is far and away ahead of any other State in total number of concerns devoted to the manufacture of the various things that go to make up the sum total of the American industry. In the Empire State there are no less than 2,329 companies that draw their support from the automobile in the making. Massachusetts is second, Ohio third, and Illinois fourth on the list.

In making up this list, fifty-one different headings were used, ranging all the way from completed automobiles, embracing ten-ton trucks, costly touring cars and the dainty little runabouts and down to cotter pins, almost as fine as small needles.

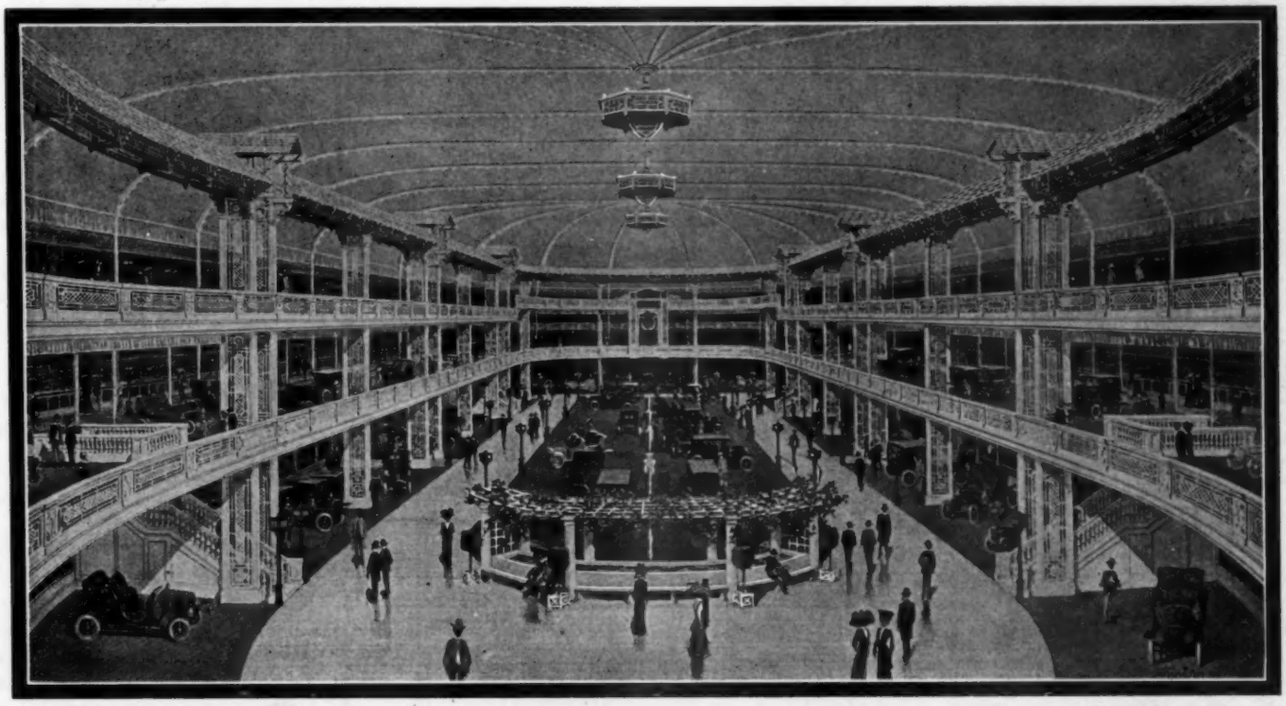
The automobile of 1910 is the most significant development of human ingenuity since the dawn of history. It represents a distinct advance step in transportation and, as the students of history declare, "a step toward perfecting transportation is a stride on the way toward perfect civilization."

No man who has due regard for facts can doubt that the annual display of automobiles in New York has had its part in this vast progressive movement. And there will be few to deny a share of credit for the development of the automobile to the Association of Licensed Automobile Manufacturers.

Gas Engine Trade Convenes

MILWAUKEE, Dec. 12—H. F. Apple, of the Apple Electric Company, Dayton, O., will be one of the principal speakers at the annual convention of the National Gas & Gasoline Engine Trades' Association, which meets at Racine, Wis., on Dec. 12, 13, 14 and 15. Mr. Apple's subject is, "The Installation of a Mechanical Ignition System Complete." H. I. Lee of Chicago, will speak on "Gas" and Joseph Tracy of New York on "Comparisons of Various Methods of Testing Engines." Charles F. Kratsch of Chicago has for his subject, "Does the Efficiency of a Gas Engine Depend on the Equipment?" Otto Heims of New York will analyze "Gas Engine Ignition."

A large exhibition of engines and accessories will be held in connection with the convention. The Mitchell-Lewis Motor Co. and Pierce Motor Co. will have a large share in the entertainment of the 400 delegates expected.



Interior of Madison Square Garden as it will appear when the doors of the Eleventh Annual A. L. A. M. Show are thrown open to the public

Palace Show Will Display Seventy Automobiles

ACCORDING to official announcement, the automobile exhibits at the Grand Central Palace Show, which opens New Year's eve, will number over 70, including all kinds of types from the smallest runabouts to big racing machines and in the commercial line embracing trucks built to carry anything from a few parcels to ten tons of bulky freight.

The accompanying illustration shows how part of the big hall will look when the show opens. The color scheme is in cream and crimson with some contrasting green tints.

The recent snowfalls in New York have more than ever demonstrated the value of the motor trucks and business wagons. Horses were found wholly inadequate to their tasks in that merchandise was held up for hours and in some cases for days in transit about the city, as is the case in almost any period of heavy snowfall when the thermometer falls below the freezing point.

The motor truck walks away with the goods that must be delivered, the merchant is learning by experience. Business vehicles of all kinds are to be shown at the International Show, which, the makers assert, will cause the horse to become a rarity on the streets of New York within the next half decade.

The first big aviation show in the United States is to be held simultaneously with the Grand Central Palace Automobile Show, and it will give New Yorkers that have never seen aeroplanes at close range, an opportunity to inspect some of the world's most famous flying machines. All of the well-known makes of aeroplanes, such as the Wright Brothers, Curtiss, Lovelace-Thompson, Bleriot and other French types of biplanes and monoplanes are to be shown, in addition to many of the machines of the new manufacturers whose ideas are just coming into practical use.

Scores of model aeroplanes are to be shown and demonstrated to visitors at the shows, and the exhibits will prove a liberal education to laymen unfamiliar to the technical and scientific side of aviation.

Among the prominent aeroplanes to be shown are:

The Wright Brothers machine in which the late Ralph Johnstone made his world's altitude record of 9,714 feet shortly before his tragic death.

A second Wright machine, which has been built for Russell A. Alger, Jr., of Detroit.

The Bleriot biplane in which John B. Moisant flew from Paris to London, making his famous Channel flight carrying a passenger with him. This machine is now at the Lovelace-Thompson Aeroplane Works being repaired.

Another Moisant machine of all steel construction, which it is expected will successfully resist heavy strains in flying against sudden "pockets" of wind and shocks in alighting.

A third machine of Moisant's in which he made his famous flight across Brooklyn and around the Statue of Liberty.

The original Santos-Dumont "Demoiselle" aeroplane which has been brought over from France for the exhibition.

Two machines built by Burgess Company and Curtiss, one of which is a large passenger-carrying biplane, and the other being a smaller biplane.

A Lovelace-Thompson passenger-carrying aeroplane, and a racing machine built by the same company.

Glenn H. Curtiss's famous machine in which he made his remarkable flight from Albany to New York, winning the $10,000 prize given by the New York *World*.

A Bleriot type monoplane, built by the Scientific Aeroplane Company of New York, in which a gyroscope has been installed to demonstrate the balancing and stabilizing power of this invention as applied to aeronautics.

A Bleriot type of monoplane made by the Metz Company of Waltham, Mass.

A monoplane of original type manufactured by the Walden-Dyott Company of New York.

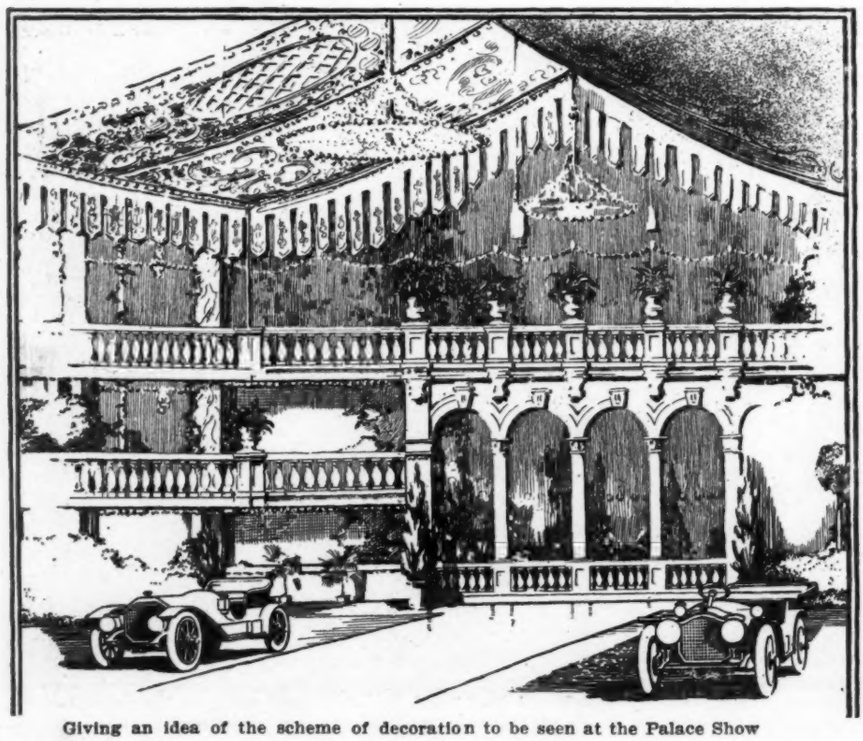
A biplane built by C. & A. Witteman of Staten Island.

A dozen other machines of types not so well known, several of them of odd and novel construction.

The Aeronautic Society of New York will display a score of models in a special exhibition booth, which is to be devoted to the interests of that organization. In another booth the Aeronautic Reserve will have an exhibit. The Reserve was organized to excite public interest in aeronautics and for the purpose of aiding the army and navy in time of need. Two tents, such as the one which was erected at the Belmont Park Meet, are to be set up in the exhibition space and numerous persons, prominent in aeronautics, are to attend.

The Junior Aero Club of America, under the direction of Edward Durant, is to be represented at the show.

Exhibitions of special attractiveness in the Aviation Division will be the showing of aeroplane accessories, consisting of engines, parts, ailerons and other sections of machines which may now be ordered and supplied upon a few hours' notice in case of accident.



Giving an idea of the scheme of decoration to be seen at the Palace Show

Stratton Resigns.

PHILADELPHIA, Dec. 12—E. V. Stratton, manager of the Philadelphia Studebaker branch, has resigned, to take effect February 1. Mr. Stratton has been in charge of the Studebaker branch for the past two years.

Brooklyn's Show in White and Gold Glory

EVER since the formation of the Brooklyn Motor Vehicle Dealers' Association there has been a ground-swell of demand for an automobile show in Brooklyn. In response to this demand, the first annual motor vehicle show ever held in Brooklyn will be staged at the Twenty-third Regiment Armory, commencing February 18 and continuing to February 25.

The building is an immense affair containing more floor space than Madison Square Garden and is located on the chief Brooklyn motor artery, Bedford avenue. Bids for space are reported in considerable numbers, even so far in advance of the show, and the promoters are confident that a comprehensive exhibition will result.

The color scheme will be in white and gold and a special set of rules to gain uniformity in decorations has been enacted. Peculiarly liberal provision has been made for the members of the trade and affiliated organizations to attend the sessions. To the public, a charge of 25 cents will be made on all days except February 21, 22, when, on account of special features, the admission will be double.

Brooklyn boasts of owning more automobiles than any other city in the land except Manhattan and the vogue of the motor car has had a significant effect upon the whole of Long Island. For these two reasons the management is confident that the show will be well patronized.

The officers of the Brooklyn Motor Vehicle Dealers' Association are: W. H. Kouwenhoven, president; J. D. Rourk, first vice-president; C. F. Batt, second vice-president; C. M. Bishop, secretary; I. C. Kirkham, treasurer

Exhibition Committee: C. F. Batt, chairman; W. H. Kouwenhoven, H. L. Carpenter, E. T. Bloxham, Joseph D. Rourk, C. M. Bishop, I. C. Kirkham, W. H. A. Bruns, A. W. Blanchard, H. W. Palmer, M. J. Wolfe, Frank G. Dunham, Matchett & McFarlane, H. W. C. Hasbrouck, A. R. Townsend, Charles Carlson

Reception Committee: E. T. Bloxham, chairman; C. M. Bishop, H. L. Carpenter, W. H. A. Bruns, W. H. Kouwenhoven, J. D. Rourk, H. W. C. Hasbrouck, Chas. F. Batt, I. C. Kirkham, A. W. Blanchard.

Finance Committee: H. L. Carpenter, chairman; C. M. Bishop, E. T. Bloxham, C. F. Batt, W. H. Kouwenhoven.

Entertainment Committee: J. D. Rourk, chairman; Frank Dunham, H. W. C. Hasbrouck, H. L. Carpenter, C. F. Batt.

Press Committee: W. H. A. Bruns, chairman; Chas Carlson, A. R. Townsend, E. T. Bloxham, F. G. Dunham.

Transportation Committee: A. W. Blanchard, chairman; M. J. Wolfe, J. Matchett, H. W. Palmer, Chas. Carlson, A. R. Townsend.

Automobile show manager, Chas. H. Green.

Cleveland Shows Promising

CLEVELAND, Dec. 12—Arrangements for Cleveland's two automobile shows are progressing satisfactorily. The first show, held under the auspices of the Cleveland Automobile Show, will be given at Central armory the week of February 13. Frank Philips, Harry Moore, H. M. Adams and C. M. Brockaway are the committee in charge. George Collister has been appointed manager and has arranged for the opening to take place Saturday night, February 18.

The Manufacturers' and Dealers' show will open Saturday night, March 11, at Central armory. A committee composed of W. H. Barger, Ray Colwell, Harry G. Smith and H. J. Twelvetree has been appointed and 196 applications for space have already been received. The balcony and main floors will be used for automobiles and the banquet hall for accessories.

The committees of both shows are planning elaborate decorations and both shows will be the largest that the city has seen.

Queen City Show in Music Hall

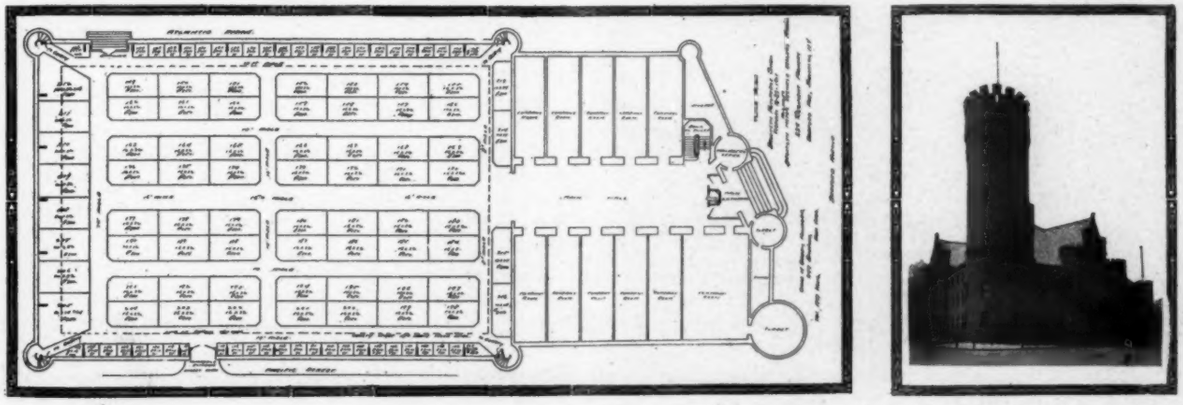
CINCINNATI, O., Dec. 12—Although the application blanks for space at the Cincinnati Automobile Show to be held at Music Hall from February 20 to 25 have been placed in the mail during the last few days, there is already a decided demand for space, indicating that the exhibition this year will be, in every way, more comprehensive than any enterprise of the kind heretofore arranged for Cincinnati.

The executive committee of the Cincinnati Automobile Dealers' Association will conduct the show this year. It has been decided that the entire first floor of the south wing of the Music Hall will be given over to automobiles exclusively. Accessories, motor boats, flying machines, and other special attractions, including the roof garden, will be located on the second floor.

Will Mail Newark Show Blanks

NEWARK, N. J., Dec. 12—Application blanks of the forthcoming Newark show, which takes place from February 18 to 25 in the First Regiment armory, are being mailed this week. A vast volume of inquiries has been directed at the promoters of the enterprise from prospective exhibitors and the indications are favorable for the disposal of all available space long before the show opens. Engineers have been busy measuring the armory and mapping out exhibition spaces.

The decorative scheme, while not yet fully worked out, will be elaborate. Offices of the show committee have been opened on the tenth floor of the Firemen's building.



Ground plan showing arrangement of the Brooklyn Show in 23rd Regiment Armory, and a view of the exterior of the building

Permanent Auto Show Is Being Planned

PREPARATIONS are being made with vigor to renovate the Brewster Building, Forty-eighth street and Broadway as the home of a permanent automobile exhibit in New York. The plan is being carried out by Frank E. Malone, 1670 Broadway, who handles the Mora and the Westcott cars. It is the intention of Mr. Malone to open the show December 26 and continue its first instalment until after the conclusion of the A. L. A. M. show at Madison Square Garden.

The idea, as advanced by Mr. Malone, is of considerably more breadth than a simple automobile show. In outlining his plan, Mr. Malone said: "I have secured the Brewster building on long lease and am busy now installing lighting, heating and communicating systems in anticipation of the opening of the show. There are five floors in the building, each with a floor space of about 7,000 square feet. On the main floor there is sufficient room for twenty-two car exhibits. On the second and third floors the accessories will be shown. On the fourth we will have a line of aeroplanes and on the top floor inventions and patented devices of a mechanical nature will be exhibited."

Caley Gets Club Job

CINCINNATI, O., Dec. 12—The announcement has been made by the directors of the Cincinnati Automobile Club of the appointment, effective January 15, 1911, of Frederick H. Caley, as general manager of the organization. The place, which was created especially for Mr. Caley, was offered him to-day at a meeting in the Gibson House club quarters, and Mr. Caley accepted it.

The new general manager is at present registrar of automobiles in the office of Secretary of State Carmi A. Thompson, in Columbus, O., is the author of much of the present legislation affecting the licensing, operation and regulation of motor vehicles, and is credited with many reforms in the relations between the State and automobile owners, which other States have been quick to seize upon and incorporate into their own laws.

St. Louis Space Snapped Up

ST. LOUIS, Mo., Dec. 12—It is announced that about 90 per cent. of the space available in the Coliseum for the Fifth Annual Automobile Show, to be held February 13 to 18, has been taken. It is estimated that nearly 150 cars will be shown, many of which will be shipped to St. Louis from the National Show at Chicago, which closes the Saturday preceding the Coliseum exhibit.

Among the dealers who have taken space are the Beguelin-Buschart Motor Car Company, with the Selden car; the Case Threshing Machine Company, with Case cars; the Cook Motor Vehicle Company, with the Columbus Electric, Krit and Firestone-Columbus; Franklin Automobile Company, with the Franklin; Grand Motor Car Company, with the Regal; Gray Motor Car Company, with Kline cars; Hall Automobile Company, with the Jackson; Haynes Automobile Company, with the Haynes, Cole and Page; Kardell Motor Car Company, with the Reo, Fal, Michigan and Gramm truck; Kissel Kar agency, with the Kissel; Mound City Buggy Company, with the Halladay; Overland Motor Car Company, with the Overland; Pope-Hartford Motor Car Company, with the Pope-Hartford and Everitt; Southern Auto & Machine Company, with the Ohio gasoline car; Smith Auto & Battery Company, with the Ohio electric; St. Louis Stearns Auto Company, with the Stearns; Swartz Auto Company, with the Velie; Van Cleave Auto Company, with the Speedwell; White Garage Company, with the White; Whitman Motor Car Company, with the Mercer and the Grabowsky truck, and the Wilcox Trux Company, with Wilcox trucks and the Rayfield.

The German invasion brings along a Cyklonette type of vehicle for package and other forms of nimble delivery

Date for Baltimore Show

BALTIMORE, MD., Dec. 12—The annual show in this city will be held February 20. Whether it will be entirely under the auspices of the Maryland Club, as last year, or be given jointly by the club and dealers will be decided within the next few weeks.

The announcement that the show would be held on the date mentioned was made by Dr. H. M. Rowe, president of the Automobile Club of Maryland and the White Automobile Company, at a meeting of twenty representative dealers the past week who met to formulate the Baltimore Automobile Dealers' Association The first step in forming this organization of dealers was taker and further action will take place within the next week.

Syracuse Exhibition to Follow Boston Show

SYRACUSE, N. Y., Dec. 12—At a meeting of the Syracuse Automobile Dealers' Association, held at the Yates Hotel, at which President C. Arthur Benjamin, M. W. Kerr, George E. Messer, T. F. Willis and J. H. Valentine were present, it was definitely decided to hold the third annual show in the State Armory during the week of March 14. M. W. Kerr was again elected chairman of the show committee, the members of which will be selected later.

In selecting the date, the Association arranged, as usual, to follow the Boston show, which is dated from March 4 to March 11. It is understood that some of the Hub exhibits will be sent on. Negotiations for the use of the State Armory for the week of the exhibition have been completed.

What German Invasion Offers This Week

The Cyklonette, as the illustration shows, is a three-wheeler. It is made by the Cyklon Machinenfabrik G.m.b.H., Berlin, and it is handled in America by Richard B. Darré, who has one of the cars at the garage, 2 West Ninetieth street, New York City. The motor is placed on springs on the fork of the front wheel, which is also fitted out for steering, and the drive is by means of a sprocket set. The motor is of the air-cooled type and cooling is rendered more effective through the use of a vacuum system which works automatically. The machine is well made, is suited to running over ordinary pavement, and the tire equipment is 650 x 80 millimeters all around. The full set of brakes includes double bands for the rear wheels in addition to tire brakes. The length of the wheelbase is 100 inches, with a tread of 56 inches. The frame is of tubular steel, and the body is of stamped metal. The speed is about 30 miles per hour, and the motor is rated at 6 horsepower. The size of the cylinder of the motor is 72 x 90 millimeters, the stroke being relatively long.

Ready to Draw in Milwaukee

MILWAUKEE, Dec. 12—The first drawing for space for the first annual show of the Milwaukee Automobile Dealers' Association will be held in the Auditorium, Milwaukee, Wis., on Dec. 15. Applications for the first drawing must be in the hands of the show committee or Manager Bart J. Ruddle, on Dec. 14.

This show will be the third to be held in Milwaukee, the Milwaukee Automobile Club having held shows in 1909 and 1910. This year the dealers' association undertook the management with the co-operation of the club. The semi-annual meeting of the Wisconsin State Automobile Association will be held at the Auditorium during the show, which opens January 16 and closes January 21.

Figure on Two Halls at Hartford

HARTFORD, Dec. 12—From present indications the forthcoming show of the Automobile Dealers' Association, which is to be held in Hartford Foot Guard Armory the last week in February, or the first week in March, will be the biggest thing the show committee has ever attempted. A member of the committee states that two halls the size of the armory could easily be filled if all applications for space were considered.

It is not unlikely that another hall may be rented and two shows operated by the dealers' association, one admission covering both exhibitions.

To Build Road Across State

NASHVILLE, Dec. 12—Governor-elect Benj. W. Hooper, who will take his seat as chief executive of Tennessee in January, has inaugurated a project to build a State highway across the State the long way, from the extreme border in the mountains on the east to the Mississippi on the west, touching en route many of the leading cities and towns of the State and passing through the capitol city. The road will be about 600 miles in length.

The plan is to build the highway in two days, the work being done by thousands of volunteers and the material, wagons, tools and other things being donated.

Permanent Good Roads Body

INDIANAPOLIS, Dec. 12—Permanent organization was decided upon by the Indiana Good Roads Association before that body adjourned last week. A committee to accomplish this result was named as follows:

Indiana Engineering Society—C. C. Brown and Professor W. K. Hatt.

Indiana Bureau of Good Roads—J. C. Crabill and G. J. Pyle.

Indiana Manufacturers' Bureau—M. W. Mix and J. L. Ketcham.

Indiana Rural Letter Carriers' Association—W. J. Ward and J. O. Bonebrake.

Northern Indiana Good Roads Association—Lorenzo D. Hall and Cadmus E. Crabill.

Indiana State Trustees' Association—C. E. Pittinger.

Indianapolis Trade Association—C. G. Fisher and C. A. Bookwalter.

Indianapolis Commercial Club—William Fortune and Hugh Dougherty.

Indianapolis Board of Trade—Bert A. Boyd and William Scott.

Indianapolis Manufacturers' Association—H. H. Rice and S. C. Parry.

Indianapolis Automobile Trade Association—Fred I. Willis and F. O. Smith.

Indiana Conservation Society—William Holton Dye and Dr. H. O. Pantzer.

C. A. Kenyon will continue to act as chairman and Will J. Dobyns as secretary until the permanent organization is effected.

Aside from the matter of organization, this committee was empowered to appoint a sub-committee to draft a bill for presentation to the legislature, authorizing the formation of a State highway commission.

Dinner to David Bruce-Brown

David Bruce-Brown was tendered a testimonial dinner by the Benz Auto Import Company of America, in recognition of his services in winning the Grand Prize Race at Savannah, November 12, at the club house of The Automobile Club of America, Friday evening. The occasion brought together members of the Automobile Club, members of the Savannah Automobile Club, members of the Benz Auto Import Company, newspaper men and many personal friends of the winner of the Grand Prize.

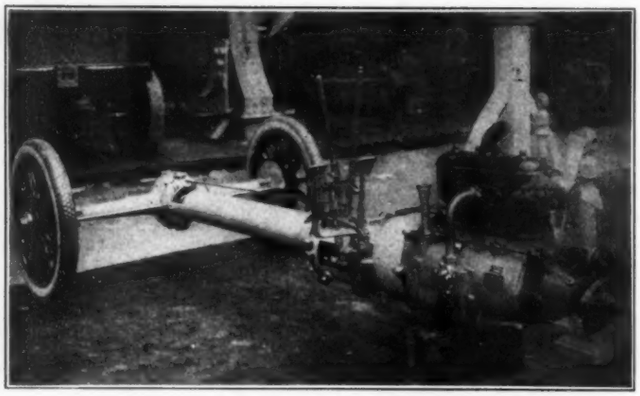
The dinner was set in the grand salon.

Mr. Schwarzkopf, acting as toastmaster, introduced Robert Morrell, of the Motor Cups Holding Company, who made the presentation of the prize, calling attention to the spirit of the race. Mr. Bruce-Brown responded, paying a tribute to his competitor in the race, Ralph De Palma.

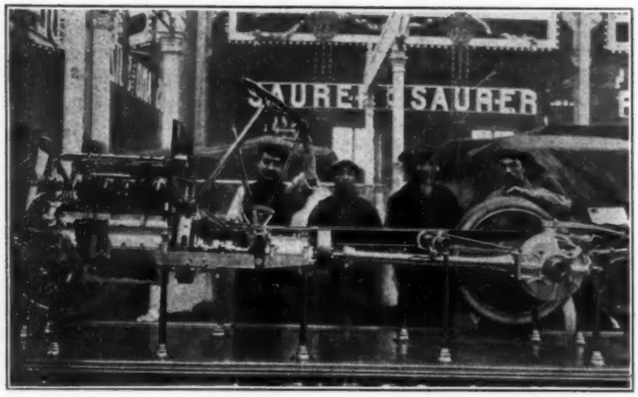
Mr. Neumier, selling agent of the Benz Auto Import Company in Germany, spoke and was followed by Thomas Moore, of New York; Charles Ellis, of Savannah; Major Humphrey, of the Post, and Ralph De Palma.

The dinner closed with a brief compliment by Mr. Froelich to the Savannah Automobile Club for the very efficient manner in which it conducted the race.

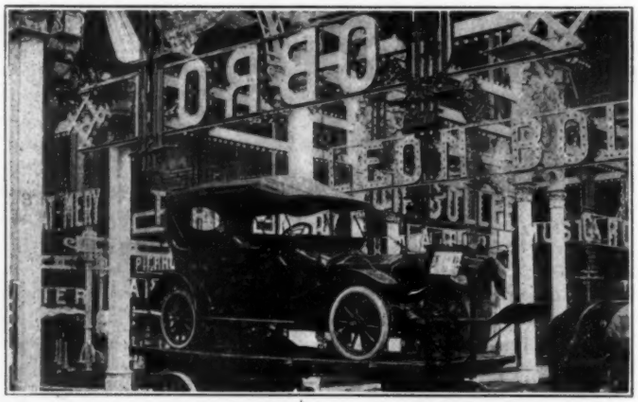
Testimonial dinner tendered to David Bruce-Brown, Grand Prize winner, at the Automobile Club of America



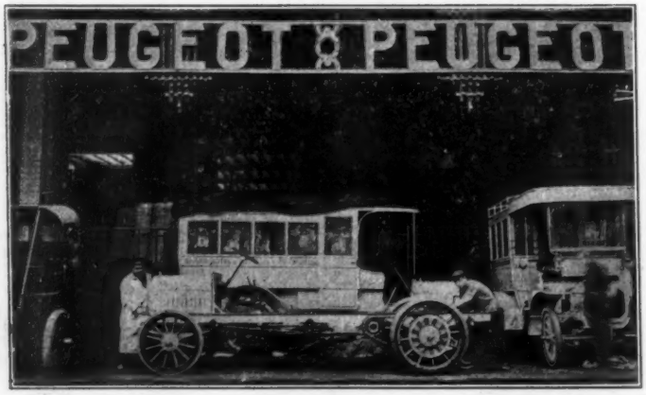
Chassis Lacoste et Battmann of the Simplicia car



Section of the De Dion Bouton chassis



Placing a De Dion Bouton chassis on the stand



Twelfth Salon in Paris. Preparing the Peugeot stand before the opening

Long Stroke Motors

PARIS, Dec. 3—Two years ago the Automobile Club of France was at the head of the annual exhibitions held in the Grand Palais. Last year, under the influence of the slump and a theory that cars could be sold without a costly exhibition, no show was held in France. Later the leading manufacturers became convinced that they had been enriching a private club for ten years; they decided to break off all connections, to hold their own show, to give the Automobile Club of France an honorary position only, and to make the event a purely business exhibition. And it was this exhibition which was thrown open to the public this morning after a formal inauguration by President Fallières attended by practically all the members of the government.

Bloc casting of the cylinders has won its position. After seeing six cylinders as high as 3 1-2 inches bore cast in one bloc, it cannot be denied that this method has the approval of engineers The models are to be found on such important stands as Panhard, La Buire, Delage, etc. From 80 millimeters bore down it has now become the general rule to cast all four cylinders together.

With a view to keeping down length, a few firms have adopted V-casting for six-cylinder motors in preference to bloc casting in Indian file. The most notable example is a Delahaye, with a six-cylinder V-motor. Another example is the Aries Company with six-cylinder motors of 60 by 100 and 75 by 120 millimeters cast in one bloc with their cylinders inclined only 7 1-2 degrees from the vertical.

Although there are more six-cylinder motors than ever before and indeed very few firms that have not adopted a six, there is not a single instance of a four-cylinder model having been dropped to make room for a six, and not a single firm producing sixes exclusively.

Motor Truck Club to Hold Run

The Motor Truck Club, an organization famed for the purpose of conducting and administering reliability and economy tests of commercial trucks has elected the following officers: James Hemstreet, president; F. B. Porter, vice-president and E. A. Levy, secretary and treasurer.

The first contest to be staged by the club will be a run from New York to Boston and return, if the event obtains official sanction. It is planned to have the start during the second week in January and the finish is aimed to be simultaneous with the opening of the second week of the A. L. A. M. show.

The route proposed is about 500 miles long. Under the tentative rules submitted to the Contest Board the cars will carry the minimum catalogue load.

Tollgates Are Disappearing in Maryland

Tourists in Maryland will be more than delighted to know that the Baltimore and Frederick Turnpike has been purchased by the State Road Commission and that the tollgate from Baltimor to Boomsboro will be closed. The tollgates from Boomsboro to Hagerstown are already closed, owing to proceedings against the company for not keeping the road in repair.

It is common knowledge that the Pennsylvania and Maryland Turnpikes are often worse than dirt roads in other States, and the tourist wonders why he is compelled to dig down every few minutes for the privilege of destroying his tires. The spirit of progress has at last reached these benighted States and even in Pennsylvania some of the principal tollgates have been closed, the most notable instance being that at Trevose or La Trappe on the main Philadelphia Trenton Route, No. 221, as given in the Official Automobile Blue Book.

at the Paris Salon

The extension of thermo-syphon cooling is remarkable. Once adopted there is not a single firm having gone back to pump circulation, and the firms that have tried it on their smaller models have gradually extended it to the larger cars.

While abolishing the pump for the water circulation, most manufacturers have taken it up for lubrication.

Since the adoption of the Knight motor on this side, the demand has been for greater silence.

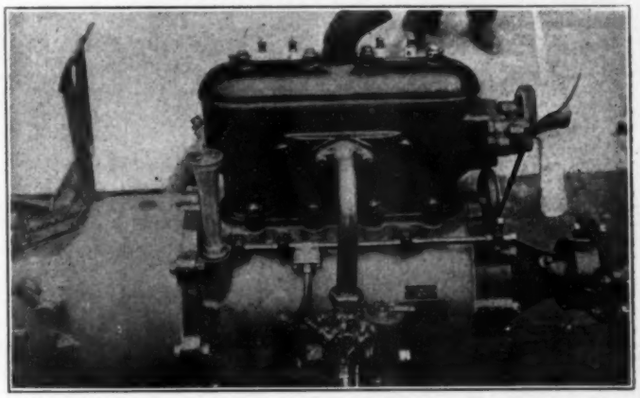
Worm drive and front wheel brakes, two strongly British features, have not met the approval of Continental manufacturers. Outside the English section there is not a worm drive at the show and there is an equal lack of front wheel brakes. Wire wheels are offered when specially requested, but they are not made a standard feature by any firm.

Continental manufacturers who clung to the chain for the highest powered cars have practically abandoned it in favor of shaft drive. There is no uniformity in rear axle construction and just as little in the matter of distance rods and torque stays.

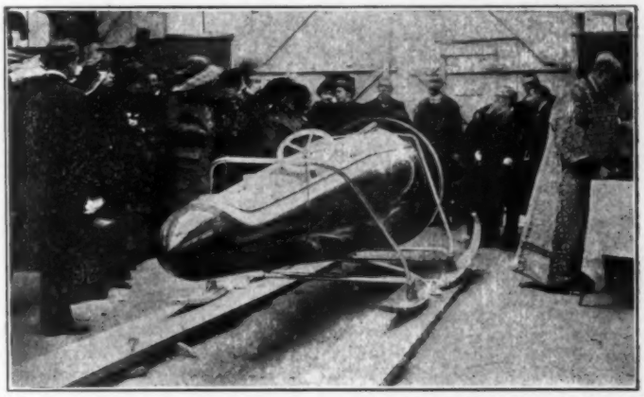
Springs are lengthened, are generally of the three-quarter elliptic type, and in a few cases, as on the Rénault, have their seating under the axle, not above it. It it becoming common to shorten the upper portion of the three-quarter elliptic, in order to avoid side sway. Offsetting of the springs has also been adopted, especially for the platform type, this effectively preventing any tendency to roll when heavy bodies are carried. This method has also been adopted with the three-quarter elliptic type.

Probably 50 per cent. of European houses have adopted four-speed gear boxes in place of three speeds. On the Aries cars a chain-driven gear box has been adopted in place of spur gears. Sautter-Harle has produced a novelty in the form of a patented four-speed gear box with internally meshing teeth.

Preparing the Brennabor stand



Aster engine in the Simplicia chassis



Popes of the Russian Church blessing a motor sleigh

An example of a polished chassis arriving in the church

Will Attend the New York Shows

DETROIT, MICH., Dec. 12—At least two large parties will go to New York from here to attend the metropolitan shows, the first leaving December 31 and the second on January 4. The Wolverine Automobile Club, which in the short space of five months has developed into a flourishing and influential organization, has made arrangements to have special cars attached to the regular Michigan Central train leaving here at 3:45 p. m. on those dates, and many of the club members are planning to take advantage of the accommodations.

Virginia Cars Must Be Retagged

RICHMOND, VA., Dec. 14—The licenses of all owners of automobiles in Virginia to operate their cars on the State roads or city streets, must be renewed on January 1, 1911, or they will be liable to prosecution. Under the recently enacted State law on the subject, these licenses must be renewed annually.

Grand Rapids Is Optimistic

GRAND RAPIDS, MICH., Dec. 12—The second annual automobile show will be held here next February under the auspices of the Grand Rapids *Herald*. Local automobile men are looking for a larger exposition than last year.

The American Locomotive Company, makers of the Alco car will exhibit this year's Vanderbilt cup at the exposition. Last year's show was a remarkable success. It was largely attended, not only by people of this city, but by visitors from all over the country.

Peeps Through Auto Goggles at Distant Lands

AMERICAN makers and exporters of automobiles who wish to build up trade in Rio de Janeiro, South America, cannot hope to compete with European exporters unless they show their goods. This is one of the reasons why the United States has a very small automobile trade in the fine country of Brazil. The Americans do not display their wares in the right way. The majority of the large commercial houses are either German, English or French. Goods of all sorts are dear there. The agent of a foreign house who is a resident of Rio de Janeiro must needs sell his automobiles if he would live. Good American-made shoes, baking-powder and food are high. And so are automobiles. But not five per cent. of the machines owned and registered in Rio de Janeiro—and there are five hundred of them—were manufactured in the United States. One American who operates a machine in that city declares that the American manufacturers will not stand by their automobiles, and that he could not succeed in getting any guarantee from them. As the American cars seen there are not built on the metric system, it is impossible for the local machinists to supply duplicate parts. Americans will not guarantee to keep duplicate parts in Rio de Janeiro. The European manufacturers supply their South American agents with duplicate parts.

Upon his arrival in Germany, the foreign automobile tourist, if not provided with an International passport, is furnished with a special elliptical number-card. A fee of two marks (47 cents) is collected for one day's stay within the Kaiser's kingdom. Taxes on foreign-made automobiles are scheduled as follows: One day's stay, 71 cents; two to five days, $1.90; six to fifteen days, $3.57; sixteen to thirty days, $5.95; thirty-one to sixty days, $9.52; sixty-one to ninety days, $11.90. The days need not be consecutive. The days in which the automobile remains in the garage or in the repair shop or while it is absent from the country are deducted, provided that a card of admission, or a tax-card, has been stamped by the customs officer at the border, when departing from and returning to Germany.

American-made cars cut scarcely any figure in France. The policy of soliciting trade by means of catalogues and circulars does not avail there. The average Frenchman (especially the Parisian) is "from Missouri," and he demands to see the goods before investing his money in an automobile. Besides, the machine must be of the very latest type; and it should be exhibited in an important centre to attract attention. It is vitally essential that the salesman shall be able to describe the machine in the French tongue.

Johannesburg, South Africa, is open for a good, medium-priced type of motor-delivery wagon for city use. In order to enter the field for the sale of automobiles, it is necessary that the business should be carried on through local representatives, the ordinary South African invariably having his suspicion of the stranger.

The demand for automobiles in Great Britain is increasing, 203,227 machines being now registered in the United Kingdom.

A German has invented an armored automobile to fight airships. Technically it is known as an armor-clad automobile. It is fitted with a 60 horsepower gasoline engine. The machine is able to take steep grades. It is equipped with a two-inch rapid-fire gun as armament. The vehicle, including five men, the gun, ammunition and general outfit, weighs 7,350 pounds. One hundred shrapnels comprise the ammunition, each shrapnel containing 128 projectiles of hard lead, in addition to the explosive charge. The double shrapnels are wings of babbitt, in which teeth are cut which revolve outward, their purpose being to tear the canvas of the balloon when it is hit. A one-eighth inch thick nickel-steel armor covers the automobile. A maximum range of about four and three-quarter miles is attained.

The introduction of a new spring-wheel for motor vehicles is about to be introduced in England, it being the invention of a Britisher. Eighteen links comprise the periphery of the wheel. Triangular wooden block comprise the links; and while the bases comprise the periphery each of the pieces is hinged to a piece of metal which is firmly attached to a volute spring, ranging from four to five inches in length, according to the weight of the vehicle that has to be supported. The other ends of these volute springs, eighteen in number, disposed radially, are fixed to the hub, or, rather to a small inner wheel of the ordinary artillery pattern with twelve spokes. The springs are made of slightly tapered strips of special steel coiled spirally in such a way that the greater part of each turn is within the preceding one and that under sufficient compression the whole of the inner coils can be forced to within the outermost one. Blocks of a hard composition of fibre and gutta-percha compacted under pressure are cemented to the surface of the links which roll on the ground. These can be renewed when worn away at a cost of 97 cents to $1.22 for each wheel. The inventor has aimed to imitate the action of the pneumatic tire. An obstacle such as a stone does not cause the whole wheel to rise, as is the case with an ordinary iron-tired wheel, but it is, as it were, swallowed up, the link or links immediately effected yielding by virtue of the hinges and bringing into play the resiliency (re-bound) not merely of one or two of the springs, but of the whole of them round the entire circumference. The object of the invention is to apply the spring-wheel for use on heavy commercial vehicles and motor-buses, to give them the benefits of the pneumatic tire without the employment of a particle of rubber. It is claimed that with this spring-wheel it is impossible for a machine to side-slip, while the amount of dust sucked up is far less than is the case with the pneumatic tire. A pleasure car having these springs attached was run in London for experimental purposes and the wheels showed that they afford a remarkable degree of resiliency, even at high speed.

A very interesting species of sport which is gaining favor in Leicester, England, is tilting at the ring in a motor-car, society having taken to amusing itself by this means in a very lively fashion. The ring is suspended after the mode seen by the side of the merry-go-rounds, and the tilting is done while driving the automobile at good speed.

An automobile ambulance for use in the German army is one of the latest innovations. A frame is constructed, and in place of the covered wagon which prevails in cities there is no cover, the wounded or ill soldier being carried lying on the bunk, over which stand the guards and the surgeons.

Atlanta A. A. Elects Officers

ATLANTA, GA., Dec. 12—The Atlanta Automobile Association recently held its election of officers. The stockholders met first and elected the following directors: R. J. Guinn, L. J. Daniel, F. J. Paxon, Forrest Adair, V. H. Kriegshaber, F. J. Cooledge, J. D. Rhodes, C. E. Caverly, John S. Owens, E. P. Ansley, W. D. Owens, Mell R. Wilkinson, Asa G. Candler, S. P. Turman, Morton Smith, Asa G. Candler, Jr., B. M. Willingham, A. Montgomery, Brooks Morgan and John J. Woodside.

The directors then held an election and the following officers were chosen: F. J. Cooledge, president; John J. Woodside, vice-president; Asa G. Candler, Jr., secretary; W. D. Owens, treasurer.

It is uncertain what will be done with the Speedway. Owing to the fact that the A. A. A. has refused to give the local track the dates that it has wanted and because of the poor patronage on the unseasonable dates which were granted the Speedway, racing in Atlanta looks dubious.

Panama-Pacific Race to Be First of New Year

SAN FRANCISCO, Dec. 8—After months of negotiation and useless talk, it appears at last that San Francisco is to have a second Portola road race. It is to be known as the Panama-Pacific road race, because of the boom here for a Panama-Pacific Exposition in San Francisco, and the date set is January 2d. The course is the same one in Alameda county that was used last year, although it has been cut almost in half. Most of the crack cars that took part in the recent Santa Monica road race will be entered, and in addition there will be plenty of local entries, judging from the present prospects.

The Portola road race was originally scheduled for October, but in the absence of President M. H. de Young of the Automobile Club of California, it was allowed to lapse, after permits and all the general arrangements had been made. Several attempts were made by local dealers to fix up the contest, but without avail until Dick Ferris, of Los Angeles, took the matter in hand.

The Portola Racing Association was formed by the San Francisco dealers, and the Oakland Automobile Dealers' Association is also taking a prominent part, making all the arrangements for the course and raising the greater portion of the money that will be needed to pull off the race successfully.

The course chosen is said by some automobile critics to be the finest in the United States. Almost one-half of its 10.923 miles is embraced in the famous Foothill Boulevard, a magnificently constructed piece of roadway that has been called the finest in California. It is as smooth as a billiard table for most of its length, and there is no limit to the speed that may be attained, beyond the capabilities of the cars and the attention that must be paid to the few turns along the course. These turns, however, are few, and are generally so broad and sweeping that they may be taken practically at top speed.

The course is oblong in shape, each of the long stretches being about five miles in length. The two connecting stretches at the ends are very short. One stretch, as described, traverses the Foothill Boulevard, while the second stretch of five miles is virtually a straight line between the towns of San Leandro and Haywards. A good part of this stretch is between two lines of magnificent poplars. The connecting links of the oblong are over well-paved streets in the two towns. There are three or four right-angle turns to be negotiated. It has been decided not to bank any of these, it being Western experience that more accidents are caused by the reckless taking of banked turns than by forcing a man to use his best judgment and slow down for level turns. In several cases turns will be modified along the course; in fact, everything possible will be done to secure the greatest possible speed, which is regarded by the automobile men as the greatest factor in the contest.

There are to be three classes in the race—light cars, heavy cars and free-for-all. The light car race is to be in two divisions, according to displacement. The length of the course for this race will be 98.3 miles. The heavy car race will be for machines from 300 cubic inch displacement up to 600 inches, without weight restrictions. The length of the race will be 152.9 miles.

The free-for-all will be without restrictions, and the distance will be approximately 250 miles. To the winner of the small car class will go 70 per cent. of the entry fees, to the second car 20 per cent. and to the third car 10 per cent. For the winner there will also be the $1,000 trophy donated by the Oakland *Tribune*.

In the big car event there will be the same division of the entry fees among the first three cars, while in addition the winner will receive the St. Francis Hotel trophy, valued at $2,500, one of the handsomest prizes of its kind ever given. The entry fee in the free-for-all will be $250, and this will be divided on the same basis between the first three cars.

News of Maker and Dealer in Many Fields

CONFIDENCE in the continued prosperity and growth of the automobile industry is evidenced in the announcement by The Thomas B. Jeffery Company of the completion of a new giant electrical power plant for the Rambler factory at Kenosha, Wis.

The new engine room covers 6,000 square feet, and the equipment has been so installed that its capacity may be doubled at any time. There are four power units, including a 1,200-horsepower Cross Compound non-condensing alternator, with three other units of 500, 125 and 100 horsepower each.

The boiler room covers an area of 8,000 square feet, and includes three boiler units of 500 horsepower each, with automatic stokers. A complete coal-handling equipment is now being added. Each of the boiler units is equipped with an individual steel stack, five feet in diameter and 126 feet high. The area of the boiler room permits of a future complement of 3,500 horsepower, or seven such units as are now installed.

The construction of the entire group forming the power plant is of concrete and steel trusses, with fireproof tiles for roofs. In addition, five new buildings have been added to the Rambler plant during the year.

Regal Abandons Retail Business

Edward H. Barnum, who has been manager of the Regal-Detroit Auto Company at 1720 Broadway for a long time, has announced that the Regal Motor Car Company of Detroit has decided to give up selling at retail in several of the large cities. In pursuance of this idea, the Regal-Detroit Auto Company has been abandoned and Mr. Barnum has been named District Manager of the parent company with offices in the Randall building.

The territory allotted to Mr. Barnum consists of New York, Connecticut and New Jersey and he is busy at present appointing agents to represent the Regal in various places. The New York agent for the car has not been selected as yet.

Mr. Barnum has secured adequate warehouse facilities to handle and store his line and expects the new plan to work out satisfactorily. The reason for the change is the apparent possibility of economies in the routine of sale.

Electrics Grow in Popularity

SYRACUSE, N. Y., Dec. 12—There are evidences that the electric vehicle trade is being pushed in Syracuse. S. S. Daub, Jr., representing The Broc Electric Vehicle Company of Cleveland, is in the city and intends to establish an agency here. T. E. Willis, the Syracuse agent for the Oldsmobile, has taken over the Baker Electric and it is reported that several other agents, who have not heretofore carried electrics, will take on leading makes in the near future.

Meanwhile, a display of leading electric propelled vehicles, given in the Peerless show room on Noxon street, is attracting considerable attention from the public.

Kelsey Company Widens Factory

HARTFORD, Dec. 12—The C. W. Kelsey Manufacturing Company, builders of the Motorette, have leased the entire north wing of the Cheney silk mills at Morgan and Market streets.

The Kelsey plant was first located on the second floor of the north wing; now the whole wing will be devoted to the usage of the Motorette builders. An inclined runway was recently built, this being of about 28 per cent., and it provides a simple climbing test for the cars. The Motorette is to be shown at Chicago, New York and Boston.

Gramm Factory Is Completed

TOLEDO, Dec. 12—The Gramm Motor Truck Co., has just completed its big $300,000 plant at Lima, O., and General Manager B. F. Gramm, has announced the removal of the business offices from Bowling Green to that city, the change to take place to-day. The plant will be in operation in January.

Tests of the machinery and electrical work are now being made. The capacity of the plant is expected to be one complete truck a day after the first six months.

Buffalo Trade Body Board

BUFFALO, N. Y., Dec. 12—The Automobile Trade Association of Buffalo held its annual meeting, election and banquet at the Hotel Iroquois last week. The following were elected to the directorate: Chas. F. Monroe, John J. Gibson, J. C. Cramer, Ralph E. Brown, A. W. Meyers, E. E. Denniston and George Ostendorf.

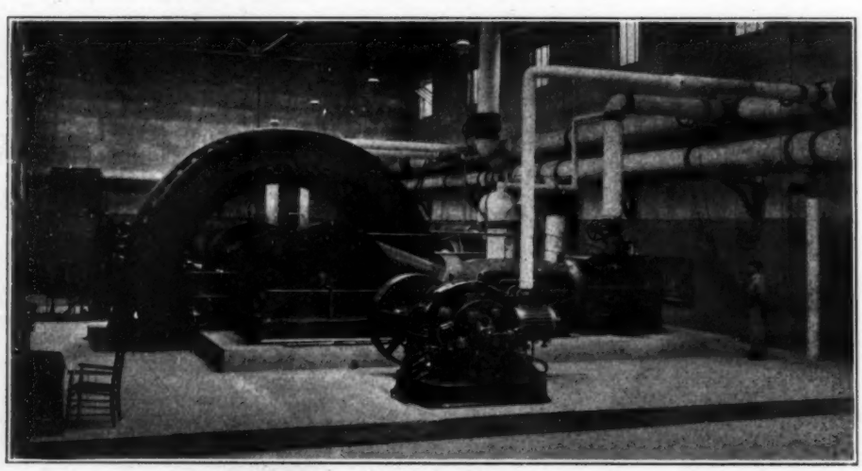
Four New Ohio Concerns

COLUMBUS, O., Dec. 12—The Vickers Motor Car Company of Coshocton, Ohio, was incorporated with an authorized capital of $25,000 to manufacture and sell all kinds of motor cars and accessories by Eugene H. McMasters, Carl B. Vickers, William C. Myers, Homer H. Kline and J. G. Kline.

The Imperial Motor Car Company, of Cincinnati, Ohio, was incorporated with an authorized capital of $150,000 to operate garages and sales agencies and handle accessories by Harry C. Strauss, Frank H. Lamb, Jacob Straus, B. Chatten and Joseph C. Kinze.

The Callen Co-operative Wheel Company, of Cleveland, Ohio, was incorporated with a capital of $50,000 to manufacture and sell vehicle wheels of all kinds and automobile accessories by Charles Callen, Clara L. Callen, Edwin A. Callen, George A. Callen and C. Cole.

The Western Compound Rubber Company, of Cincinnati, Ohio, was incorporated with a capital of $100,000 to manufacture and sell rubber articles by Henry W. Jones, John E. Pitts, J. Albert Mauss, Robert F. Jones and Harry F. Taylor.



New steam power plant at the Rambler factory at Kenosha, Wis.

News in Brief from the East, West and South

HARTFORD, Dec. 12—The Stearns, heretofore unrepresented in this section, has been taken on by Richard H. Skinner with office in the Connecticut Mutual building.

HARTFORD, Dec. 12—Harry E. Fields, vice-president of the Hartford Rubber Works Company, has resigned and on January 1 will become manager of the New York office of the Rambler.

NEW YORK, Dec. 12—Frederick R. Simms, president of the Simms Magneto Co., returned on the steamship *Campania* and is now actively engaged in the organization of the new works at Bloomfield, N. J.

AKRON, O., Dec. 12—John W. Kelly has taken the position of general factory representative with the Swinehart Tire & Rubber Company, and will give his special attention to solid tires for truck and pleasure electrics.

NEW YORK, Dec. 12—A. H. Whiting, E. C. J. McShane and Gilbert Burdett have formed a combination to handle the Cunningham line in this city. All three were formerly identified with the Dayton Motor Company.

NEW YORK, Dec. 12—The New York home of the Hudson will be removed January 1 from its present location to Fifty-fourth street and Broadway. The A. Elliott Ranney Company, which has the agency, has been cramped for room for many months.

YORK, PA., Dec. 12—Belmont S. Walters, who left the Pullman employ some time ago and signed with the Parry Automobile Company of Indianapolis, Ind., has returned to his former position, and will travel through the middle West and Southwest.

TORONTO, CAN., Dec. 12—The Goodyear Tire & Rubber Company, of Canada, recently acquired the plant of the Durham Rubber Co. of Bowmanville, Ontario, who manufactured an extensive line of mechanical goods, and enjoyed an enviable reputation.

NEW YORK, Dec. 12—The executive offices of the Licensed Automobile Dealers of the City of New York have been removed from the Thoroughfare Building to the eleventh floor of Motor Hall, 250 West Fifty-fourth street. Charles A. Stewart is the general manager.

NEW YORK, Dec. 12—Ralph DePalma, who has driven Fiat racing cars with much success, has been released from his contract with that company and will act as a free-lance during the coming season. He will drive a car of another make in the 24-hour race at Los Angeles on Christmas Day.

BALTIMORE, MD., Dec. 12—Among the recent members of the Automobile Club of Maryland are: Messrs. W. A. Fingles, Robert Crain, John Pleasants, George T. Phillips, G. E. Kraft, F. Baurenschmidt, J. Alexis Shriver, Dr. Lewellys Barker, Mrs. Charles M. Lanahan and Miss Dolly C. Fulton.

SEATTLE, Dec. 12—"Farthest North Evans," of Alberta, Canada, or rather Edmonton, Alberta, has recently completed a trip in a Cadillac car from the last Hudson Bay trading post north of Athabasca to Edmonton, a distance of 200 miles. Mr. Evans is the Coast representative of the Cadillac Company.

CHICAGO, Dec. 12—The annual century run of Ford cars will be held New Year's day as usual. The start will probably be from the headquarters of the Chicago Motor Club to Elgin and Lake Geneva. Last year 17 cars, not all of Ford make, took part in the run. Luminous confetti to mark the course was a feature of past runs.

PHILADELPHIA, Dec. 12.—George W. Hipple, Philadelphia representative of Chalmers Motor Company, has been elected treasurer of the Automobile Trade Association of Philadelphia This association of motor car and accessory dealers now has a membership of 39 automobile dealers, 21 dealers in accessories and supplies and 90 contributing members.

INDIANAPOLIS, Dec. 12—J. P. Primrose has accepted the position of assistant sales manager of the Willys-Overland Company with offices at Indianapolis. This position was formerly held by William D. Myers, who is now assistant sales manager of the Marion Sales Company, also located at Indianapolis.

LOS ANGELES, CAL., Dec. 12—The world-touring Hupmobile party has arrived in Los Angeles, having made its trip from Detroit here in 36 days. The party was met by W. M. Mason, the local representative, and party in San Bernardino, the escort being augmented in Pasadena by many cars.

TOLEDO, O., Dec. 12—The Standard Automobile Company has opened a branch on Madison avenue, for the exclusive handling of Packard automobiles. William Love, who for three years prior to his connection with the present company was associated with Kirk Bros. Auto Company, is in charge of the new branch.

ALTOONA, PA., Dec. 12—S. I. Fries of this city celebrated his 76th birthday last Wednesday by driving his car about thirty miles over the country roads. Mr. Fries lays claim to being the senior motorist of Pennsylvania. He has driven an early Franklin model for over five years. He and Mrs. Fries are planning to make quite a long tour next Summer.

RICHMOND, VA., Dec. 12—The Merchants' Motor Delivery Company Incorporated, is the latest automobile concern to secure a charter here. Its principal offices will be at Richmond. Capital stock: Maximum, $25,000; minimum, $5,000. Objects and purposes: to operate a motor transfer for the City of Richmond.

OMAHA, Dec. 12—The Marion Automobile Company has started in business in Omaha, and has a garage on automobile row. C. W. McDonald, formerly western manager of the Sandwich Manufacturing Company, resigned his position to become manager of the automobile company. The firm will have the agency for Marion cars for all of Nebraska, Northwestern Missouri, and Western Iowa. It will also handle the Overland cars locally.

National Car Fitted for Fire Fighting

The accompanying illustration is of a National car as made by the National Motor Vehicle Company, of Indianapolis, Ind., showing the same as it is fitted out for fire fighting by the Howe Company and dedicated to service at Paterson, N. J., where it was put to the test, a report of which was made on November 1 last.

For four hours the motor-driven pumps forced 413 gallons of water each minute through the 1 1-4 inch smooth-bore nozzle of the "deluge" set and hurled the water 223 feet.

The wonderful possibilities of the automobile fire engine were recently demonstrated in the presence of Mayor McBride of Paterson, Fire and Police Commissioners Ryan, Hopson and Mallon, Board of Works Commissioner Milson, Chief John Stagg and several other interested officials at East Twenty-fourth street and Eighteenth avenue.

National chassis used by the Howe Company for fire-fighting purposes at Paterson, N. J.

Among the Accessory Makers

THE ROYAL DUPLEX BRAKE; BALZER AIR-ON-TAP; BULLDOG CARBON REMOVER; SELF-CLEANING SPARK-PLUG; THE CASGRAIN SPEEDOMETER

RELIABLE DISTANCE RECORDER

The principle upon which the Casgrain Speedometer (Fig. 5), which is being marketed by the Casgrain Speedometer Co., 53 State street, Boston, Mass., is built

Fig. 1—An effective band brake

is well known in mechanics. It simply utilizes the power of a rapidly moving body of liquid, similar to the manner of the old waterwheel. The application of this liquid force in a speed indicator is original.

The outer casing is of heavy brass, cylindrical in shape. Inside this brass shell the dial, its operating mechanism and the liquid operating medium are all contained in a sealed glass cylinder.

Motion is conveyed to the liquid—a refined mineral oil—by means of four steel paddles which are rotated by the driving mechanism. The amount of liquid is a fixed quantity. The size of the confining cylinder is always the same. There is no possible chance for wear or alteration in the size of the rotated paddles. Therefore the result must always be the same.

Fig. 2 — Saves time and energy

All road shocks or engine vibrations are absorbed by the liquid. No mechanical connection exists between the driving mechanism and the dial.

A flexible shaft connects the instrument with the front wheel. This shaft gives a positive drive.

It shows on its dial an individual, large black figure for every mile, plainly readable under all conditions.

HANDY CARBON REMOVER

The accessory depicted in Fig. 3 represents a useful and quick method of removing the carbonic deposit that forms on the top of the piston and in the head of the cylinder and is used in the following manner: The flexible coil chain, made from tough soft steel wire, is inserted in the spark plug hole after the latter has been removed and a small quantity of kerosene is then inserted to assist the scavenging. The plug is reinserted and the engine run for several minutes. The ignition in the cylinder in which the operation is being carried out must be cut off and after being run at a moderate speed the motor can be shut off and the wires removed with the hooked tool through the spark plug hole. The chains are made in two sizes and either one or the other of these will adapt itself to any motor with poppet valves.

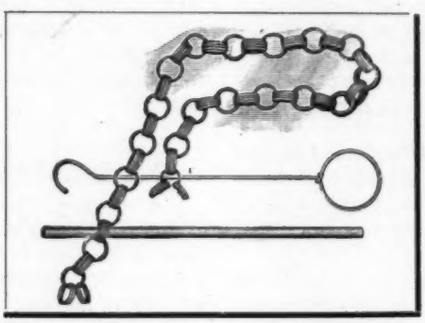


Fig. 3—"Bulldog" outfit for removing carbon

These chains are manufactured by E. S. Michener, Newcastle, Pa.

THE NEW DUPLEX BRAKE

The new brake shown in Fig. 1, designed for machinery and vehicles where the braking effect is relatively large compared with the operating force, is manufactured by the Royal Equipment Company, of Bridgeport, Conn. The retarding effect is equal in both directions of rotation of the drum. The well-known wrapping or winding effect of a flexible band surrounding and in contact with a rotating drum is made use of in this brake. One end of the flexible band is fixed, while the operating force is applied to the other end in the direction of the rotation of the drum.

AUTOMATIC CLEANING SPARK PLUG

The principle upon which this plug (Fig. 4) operates is compression of the gases in the brass bushing. A chamber of some depth is constructed, the outlet to which is six small holes at the bottom of the chamber, so drilled as to point toward the tapered mica tube insulation. When the compression takes place in the cylinder an equal amount of compression also takes place in this brass chamber. When the compression is released in the cylinder the gases rush out of the compression chamber of the plug with such force as to drive away all deposits on the tapered insulation. In actual practice these plugs have worked satisfactorily. The New York Mica & Manufacturing Co., Auburn, N. Y., are the makers of this plug.

Fig. 4—A spark plug that cleans itself

LABOR-SAVING AIR PUMP

As the name "Air-on-Tap" indicates, the cylinder illustrated in Fig. 2 can be carried on the car to save the labor of pumping while on the road. The tank is tested to 4,000 pounds hydrostatic pressure to insure security. The makers, Gus Balzer Co., 1777 Broadway, N. Y., have a charging plant which should be useful to local autoists.

Fig. 5—The Casgrain Speedometer